Leica TPS1200+
System
Field Manual

Version 6.0
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on the purchase of a TPS1200+ series instrument.

To use the product in a permitted manner, please refer to the detailed safety directions in the User Manual.

Product identification

The type and the serial number of your product are indicated on the type plate. Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorized service workshop.

Type: _____

Serial No.: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Trademarks

- CompactFlash and CF are trademarks of SanDisk Corporation
- Bluetooth is a registered trademark of Bluetooth SIG, Inc

All other trademarks are the property of their respective owners.

Available documentation

Refer to the following resources for all TPS1200+ documentation and software

- the SmartWorx DVD
- http://www.leica-geosystems.com/downloads

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1 User Interface

1.1 Keyboard

Keys

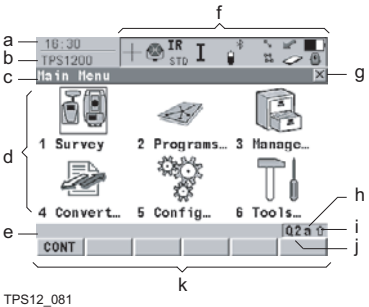
Key	Description
Hot keys **F7**-**F12**	• User definable keys to execute commands or access chosen screens. • Refer to "2 Configurable Keys" for further details.
	•
Alphanumeric keys	• To type letters and numbers.
CE	• Clears all entry at the beginning of user input. • Clears the last character during user input.
ESC	• Leaves the current menu or dialog without storing changes made.
USER	• Calls the user defined menu. • Refer to "2 Configurable Keys" for further details.
PROG (**ON**)	• If the instrument is off: to turn the instrument on. • If the instrument is on: to access the **Programs** menu.
ENTER	• Selects the highlighted line and leads to the next logical dialog/menu. • Starts the edit mode for edit fields. • Opens a list box.
SHIFT	• Changes between the first and the second level of function keys.
Arrow keys	• Move the focus on the screen.
Function keys **F1-F6**	• Correspond to the six softkeys that appear on the bottom of the screen when the screen is activated.

Key combinations

Keys	Description
PROG plus **USER**	Turns the instrument off, when in **TPS1200+ Main Menu**.
SHIFT F12	Calls **STATUS Level & Laser Plummet**.
SHIFT F11	Calls **CONFIGURE Lights, Display, Beeps, Text**.
SHIFT USER	Calls **QUICK SET Change Settings to**. Refer to "3 Quick Settings - SHIFT USER" for further details.
SHIFT ▲	Pages up.
SHIFT ▼	Pages down.

1.2 Screen

Screen



TPS12_081

a) Time
b) Caption
c) Title
d) Screen area
e) Message line
f) Icons
g) ESC ☒
h) CAPS
i) SHIFT icon
j) Quick coding icon
k) Softkeys

Elements of the screen

Element	Description
Time	The current local time is shown.
Caption	Shows location either in **Main Menu**, under **PROG** key or **USER** key.
Title	Name of the screen is shown.
Screen area	The working area of the screen.
Message line	Messages are shown for 10 s.
Icons	Shows the current status information of the instrument. Refer to "1.4 Icons". Can be used with touch screen.
ESC ☒	Can be used with touch screen. Same functionality as the fixed key **ESC**. The last operation will be undone.
CAPS	The caps mode for upper case letters is active.The caps mode is activated and deactivated by pressing **UPPER (F5)** or **LOWER (F5)** in some screens.
SHIFT icon	Shows the status of the **SHIFT** key; either first or second level of softkeys is selected. Can be used with touch screen and has the same functionality as the fixed key **SHIFT**.
Quick coding icon	Shows the quick coding configuration. Can be used with touch screen to turn quick coding on and off.
Softkeys	Commands can be executed using **F1**-**F6** keys. The commands assigned to the softkeys are screen dependent. Can be used directly with touch screen.
Scroll bar	Scrolls the screen area up and down.

1.3 Operating Principles

Keyboard and touch screen

The user interface is operated either by the keyboard or by the touch screen with supplied stylus. The workflow is the same for keyboard and touch screen entry, the only difference lies in the way information is selected and entered.

Operation by keyboard

Information is selected and entered using the keys. Refer to "1.1 Keyboard" for further details of the keys on the keyboard and their function.

Operation by touch screen

Information is selected and entered on the screen using the supplied stylus.

Operation	Description
To select an item	Tap on the item.
To start the edit mode in input fields	Tap on the input field.
To highlight an item or parts of it for editing	Drag the supplied stylus from the left to the right.
To accept data entered into an input field and exit the edit mode	Tap somewhere else on the screen outside of the input field.

Turn instrument on

Press and hold **PROG** for 2 s.

Turn instrument off step-by-step

Step	Description
☞	The instrument can only be turned off in **TPS1200+ Main Menu**.
1.	Press and hold both **USER** and **PROG** simultaneously.
2.	Press **YES (F6)** to continue or **NO (F4)** to cancel.

Lock/Unlock keyboard

Option	Description
Lock	To lock the keyboard press and hold **SHIFT** for 3 s. The message 'Keyboard locked' is momentariliy displayed on the Message Line.
Unlock	To unlock the keyboard press and hold **SHIFT** for 3 s. The message 'Keyboard unlocked' is momentariliy displayed on the Message Line.

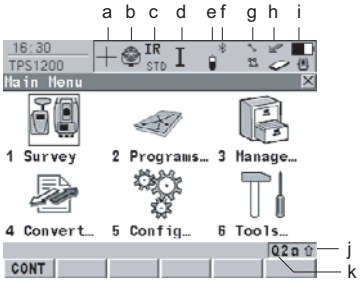
1.4 Icons

Description

The screen icons display the current status information of the instrument.

Allocation of icons

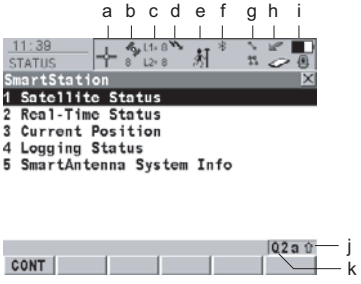
TPS specific and common icons



TPS12_172

a) ATR/LOCK/PS
b) Reflector
c) EDM
d) Compensator/face I&II
e) RCS
f) Bluetooth
g) Line/area
h) CompactFlash card/internal memory
i) Battery
j) **SHIFT**
k) Quick coding

GPS specific and common icons



TPS12_172a

a) GNSS Position status
b) Number of visible satellites
c) Contributing satellites
d) Real-time device and real-time status, Internet online status
e) Position mode
f) Bluetooth
g) Line/area
h) CompactFlash card/internal memory
i) Battery
j) **SHIFT**
k) Quick coding

ATR/LOCK/PS

- The currently active ATR/LOCK/PS settings or prism searches are displayed.
- **Touch screen:** Tapping the icon leads to **QUICK SET Change Settings to**.

Icon	Description
	ATR active.
	Low Visability mode is active.
	Short Range mode is active.
	LOCK active.
	LOCK active. Prism being followed.

Icon	Description
	LOCK active. Prism lost. Instrument locks onto reflector if in field of view.
	ATR Searching.
	PowerSearch window.
	PowerSearch active.
	Prediction.

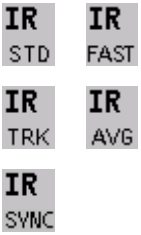
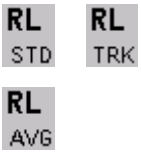
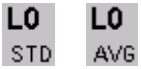
Reflector

- The currently active reflector is displayed.
- **Touch screen:** Tapping the icon leads to **MANAGE Reflectors**.

Icon	Description
	Leica Circ Prism.
	Leica 360 ° Prism.
	Leica Mini Prism.
	Leica Mini 0.
	Leica Mini 360 °.
	Leica HDS Target.
	Leica ReflTape.
	Reflectorless.
	User defined prism.

EDM

- The currently active EDM measurement settings are displayed.
- **Touch screen:** Tapping the icon leads to **CONFIGURE EDM & ATR Settings**.

Icon	Description
	EDM type: Reflector IR, possible modes are: • STD - Standard. • FAST - Fast. • TRK - Tracking. • AVG - Averaging. • SYNC - SynchroTrack
	Red laser is turned on.
	EDM type: Reflectorless RL, possible modes are: • STD - Standard. • TRK - Tracking. • AVG - Averaging.
	EDM type: Long Range LO, possible modes are: • STD - Standard. • AVG - Averaging.
	Auto points are being recorded by time.
	Auto points are being recorded by distance or height.
	Auto points are being recorded by stop & go.

Compensator /face I&II

- Compensator off or face I&II icon is displayed.
- **Touch screen:** Tapping the icon leads to **CONFIGURE Compensator**.

Icon	Description
	Compensator is turned off.
	Compensator is turned on, but is out of range.
	The current face of the instrument is shown, if the compensator and the Hz-correction are turned on.

RCS

- RCS settings are displayed.
- **Touch screen:** Tapping the icon leads to **CONFIGURE Interfaces**.

Icon	Description
	The RCS is turned o n.
	The RCS is turned on and is receiving messages.

Bluetooth

- The status of the Bluetooth port and any Bluetooth connection is displayed.
- **Touch screen:** Tapping the icon leads to **STATUS Bluetooth**.

Icon	Description
	The Instrument is Bluetooth capable. (The instrument must have a Communication side cover)
	The Bluetooth connection on Port 3 is established and is ready to be used.
	The Bluetooth connection on Port 3 is established, active and is communicating data.

Line/area

- The number of lines and areas currently open in the active job is displayed.
- **Touch screen:** Tapping the icon leads to **MANAGE Data: Job Name**.

Icon	Description
	The number of lines and areas which are currently open in the active job is shown.

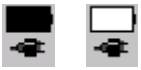
CompactFlash card/internal memory

- The status of the CompactFlash card and internal memory are displayed.
- For the CompactFlash card, the capacity of used space is shown in seven levels.
- For the internal memory, the capacity of used memory is shown in nine levels.
- **Touch screen:** Tapping the icon leads to **STATUS Battery & Memory**.

Icon	Description
	The CompactFlash card is inserted and can be removed.
	The CompactFlash card is inserted and cannot be removed. It is strongly recommended not to remove the CompactFlash card to avoid loss of data.
	The internal memory is the active memory device.
No icon	The CompactFlash card is the active memory device. No CompactFlash card is inserted.

Battery

- The status and source of the battery is displayed. If an external battery is connected and an internal battery is inserted, then the internal battery is used.
- **Touch screen:** Tapping the icon leads to **STATUS Battery & Memory**.

Icon	Description
	A TPS internal battery is inserted and in use.
	A TPS external battery is connected and in use.
	RCS and internal TPS batteries are in use.
	RCS and external TPS batteries are in use.

SHIFT

- The status of the **SHIFT** key is displayed.
- **Touch screen:** Tapping the icon shows additional softkeys.

Icon	Description
⇧	Additional softkeys are available in the currently visible screen.
⬆	The **SHIFT** key has been pressed.

Quick coding

- The quick coding is displayed. Visible during Survey and other application programs where it is possible to measure a point with quick codes.
- **Touch screen:** Tapping the icon turns the quick coding on or off.

Icon	Description
Q1	Quick coding is turned on. Quick codes with one digit are used from the active codelist.
Q1	Quick coding for quick codes with one digit is turned off.
Q2	Quick coding is turned on. Quick codes with two digits are used from the active codelist.
Q2	Quick coding for quick codes with two digits is turned off.
Q3	Quick coding is turned on. Quick codes with three digits are used from the active codelist.
Q3	Quick coding for quick codes with three digits is turned off.

GPS Position status

- Displays the status of the current position.
- **Touch screen:** Tapping the icon leads to **STATUS Position**.

Icon	Description
No icon	No position available
	Autonomous solution available.
	Code solution available.
	Phase fixed solution available. The ticks indicate that an ambiguity check is being made.

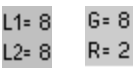
Number of visible satellites

- Displays the number of theoretically visible satellites above the configured cut off angle according to the current almanac.
- **Touch screen:** Tapping the icon leads to **STATUS Satellites**.

Icon	Description
	The number of visible satellites.

Contributing satellites

- Displays the number of satellites that are contributing to the currently computed position solution.
- **Touch screen:** Tapping the icon leads to **STATUS Satellites**.

Icon	Description
	When a position status icon is displayed, the number of satellites currently used for the position computation are shown. If no position is currently available but satellites are being tracked then the L1 and L2 values (GPS only) or the G and R values (GPS & GLONASS) show how many satellites are being tracked. The number of contributing satellites can differ from the number of visible satellites. This may be either because satellites cannot be viewed or the observations to these satellites are considered to be too noisy to be used in the position solution.
	The number of contributing GLONASS satellites could be zero if five or more GPS satellites are used for the position computation. The processing algorithm automatically selects the best possible set of satellite combinations for the position computation. A position computation with R = 0 is certainly within the specified reliability.

Real-time device and Real-time status

- Displays the real-time device configured to be used and its status.
- **Touch screen:** Tapping the icon leads to **STATUS Real-Time Input**.
- Real-time mode: Rover - An arrow pointing down indicates a rover configuration. The arrow flashes when real-time messages are received.

Icon	Description
	Digital cellular phone connecting
	Digital cellular phone receiving
	Radio receiving
	RS232 receiving
	Bluetooth enabled device attached and receiving. A digital cellular phone is shown as an example.

Internet online status

Icon	Description
	SmartStation is online in the Internet.

Position mode

- Displays the current position mode depending on the configuration defined. As soon as this icon becomes visible SmartStation is in a stage where practical operation can commence.
- **Touch screen:** Tapping the icon leads to **STATUS Logging**.

Icon	Position mode	Point occupation	Raw data logging
	Static	Yes	No
	Static	Yes	Yes
	Moving	No	No

1.5 Symbols

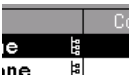
Description

The symbols provide information regarding settings.

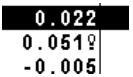
Filter

Symbol	Description	Example
⏷	The filter symbol is shown on the **Points**, **Lines**, **Area** or **Map** page if a point, line or area filter is active.	

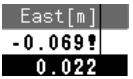
Attributes

Symbol	Description	Example
⌘	The attribute symbol is displayed in **MANAGE Codes** to indicate codes that have attributes attached.	

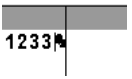
Limits

Symbol	Description	Example
?	Indicates a defined limit has been exceeded. For example, the exceeding of a residual limit in the Determine Coordinate System application program.	

Largest residual

Symbol	Description	Example
!	This symbol is used to indicate the largest residual in **DET C SYS Step 4: Check Residuals**.	

Staked out

Symbol	Description	Example
⚑	This symbol is used in **MANAGE Data: Job Name** to indicate points which have been staked out. The staked out flag can be reset in **MANAGE Stakeout Filter**.	

2 Configurable Keys

2.1 Hot Keys

Description

- Two levels of hot keys exist:
  - The first level are the keys **F7, F8**, ..., **F12**
  - The second level is the combination of **SHIFT** and **F7, F8**, ..., **F12**

Functionality

- Hot keys provide a shortcut for quickly and directly carrying out functions or starting application programs assigned to the keys. The assignment of functions and application programs to hot keys is user configurable.

Access

- The first level is accessed by pressing **F7**, **F8**, ..., **F12** directly.
- The second level is accessed by pressing **SHIFT** first followed by **F7**, **F8**, ..., **F12**
- Hot keys can be pressed at any time. It is possible that a function or application program assigned to a hot key cannot be executed in certain situations.

Defining hot keys

- Refer to "19.2 Hot Keys & User Menu" for further details.

2.2 USER Key

Description

- The **USER** key opens the user defined menu.

Functionality

- The user defined menu can be configured to contain the most used functions and/or the most used application programs.
- Selecting an option in the user defined menu carries out the function or starts the application program assigned to the option.

Access

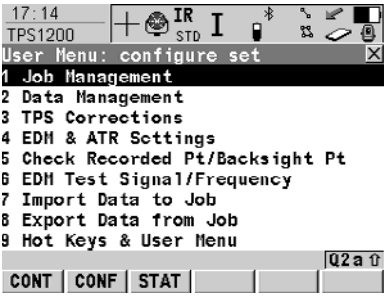
- Press **USER** to access **TPS1200+ User Menu: configuration set**.
- This menu cannot be accessed when a **CONFIGURE** screen is open.

Defining USER key

- Refer to "19.2 Hot Keys & User Menu" for further details.

TPS1200+ User Menu: configuration set

- This is an example of what a user defined menu can look like. The softkeys and their order is fixed. The functions and application programs which are assigned to the individual places in the user defined menu can differ depending on the configuration.
- The user defined menu is stored with the currently active configuration set.



CONT (F1)
To execute the selected function.

CONF (F2)
To configure the user menu.

STAT (F3)
To access the **Status Menu**.

3 Quick Settings - SHIFT USER

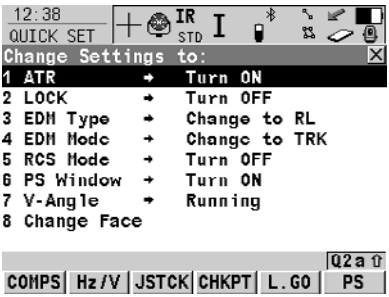
Description

This screen displays the possible settings to change to. All possible settings have two states and allow very quick setting changes. Highlight a field and press **ENTER** to change to the displayed setting or press the number next to the function.

Access

Press **SHIFT USER**.

QUICK SET Change Settings To



COMPS (F1)
To turn the instrument using compass readings.

Hz/V (F2)
To turn the instrument to a specific entered position.

JSTCK (F3)
To turn the instrument using the arrow keys.

CHKPT (F4)
To check a point or the instrument orientation.

L.GO (F5) or **L.INT (F5)**
L.GO (F5) to start an ATR search, to set **<Automation: LOCK>** and to lock onto the reflector.
L.INT (F5) to interrupt LOCK.

PS (F6)
Starts a prism search with Power-Search.

Description of fields

Field	Option	Description
ATR	**→ Turn ON**	To activate ATR, **<Automation: ATR>.**
	→ Turn OFF	To deactivate ATR, **<Automation: None>**.
LOCK	**→ Turn ON**	To activate LOCK, **<Automation: LOCK>**.
	→ Turn OFF	To deactivate LOCK, **<Automation: None>**.
EDM Type	**→ Change to IR**	To activate measurements to reflectors, **<EDM Type: Reflector (IR)>**.
	→ Change to RL	To activate reflectorless measurements, **<EDM Type: Reflctrless (RL)>**. Deactivates ATR and LOCK, **<Automation: None>**.
EDM Mode	**→ Change to TRK**	To activate tracking with continuous measurements, **<EDM Mode: Tracking>**.
	→ Change to STD	To activate single measurements, **<EDM Mode: Standard>**.

Field	Option	Description
RCS Mode	→ **Turn ON**	To activate RCS mode and LOCK, **<Use Interface: Yes>** in **CONFIGURE RCS Mode, <Automation: LOCK>**.
	→ **Turn OFF**	To deactive RCS mode, **<Use Interface: No>** in **CONFIGURE RCS Mode**.
PS Window	→ **Turn ON**	To activate the PowerSearch window, **<PS Window: On>**. Prisms are searched for with PowerSearch in the PS window when **PS (F6)** is pressed. ☞ If **<PS Window: On>** is selected and reflectorless measurements is still set, **<EDM Type: Reflctrless (RL)>**, then this is changed to measurements to reflectors, **<EDM Type: Reflector (IR)>**.
	→ **Turn OFF**	To deactivate the PowerSearch window **<PS Window: Off>**. A 360° search is performed when **PS (F6)** is pressed.
V-Angle	→ **Hold**	The displayed value for the vertical angle is held after **DIST (F2)** and until **REC (F3)** is pressed, **<V-Angle: Hold after DIST>**.
	→ **Running**	The displayed value for the vertical angle is updated after **DIST (F2)** is pressed, **<V-Angle: Running>**. ☞ Be aware that after restarting the instrument this setting remains and is not changed.
Change Face	no choices	To change the face of the telescope.

Next step

Highlight the desired item and press **ENTER**.

OR

Press the desired softkey.

4 Instrument Setup

4.1 Instrument Setup

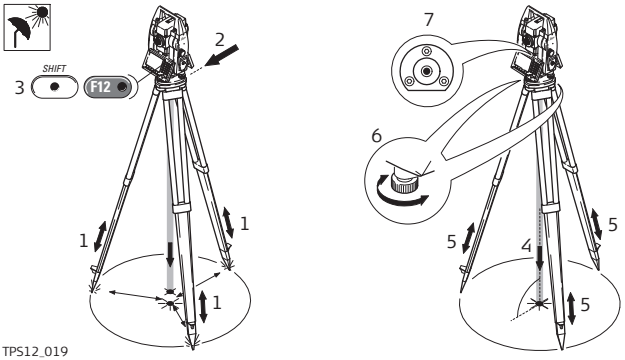
Description

This topic describes an instrument setup over a marked ground point using the laser plummet. It is always possible to set up the instrument without the need for a marked ground point.

Important features:

- It is always recommended to shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.
- The laser plummet described in this topic is built into the vertical axis of the instrument. It projects a red spot onto the ground, making it appreciably easier to centre the instrument.
- The laser plummet cannot be used in conjunction with a tribrach equipped with an optical plummet.
- Refer to "TPS1200+ Technical Reference Manual" for additional information on using the laser plummet.

Setup step-by-step



Step	Description
	Shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.
1.	Extend the tripod legs to allow for a comfortable working posture. Position the tripod over the marked ground point, centring it as well as possible.
2.	Fasten the tribrach and instrument onto the tripod.
3.	Turn on the instrument by pressing **PROG** for 2 s. Press **SHIFT (F12)** to access **STATUS Level & Laser Plummet**, activating the laser plummet.
4.	Move the tripod legs (1) and use the tribrach footscrews (6) to centre the plummet (4) over the ground point.
5.	Adjust the tripod legs to level the circular level (7).
6.	By using the electronic level turn the tribrach footscrews (6) to precisely level the instrument.

Step	Description
7.	Centre the instrument precisely over the ground point (4) by shifting the tribrach on the tripod plate (2).
8.	Repeat steps 6. and 7. until the required accuracy is achieved.

4.2 Levelling Up with the Electronic Level

Description

The **STATUS Level & Laser Plummet** screen can be used to precisely level up the instrument with the electronic level using the foot screws of the tribrach. The longitudinal and transverse tilt of the instruments vertical axis is graphically and numerically displayed.

Access

Press **SHIFT F12**.

Levelling the instrument with the electronic level step-by-step

Step	Description
1.	**STATUS Level & Laser Plummet** Use the foot screws to move the electronic level to the centre.
☞	The level moves linear with the inclination values **<Tilt L:>** and **<Tilt T:>**. On the screen closest to the circular level, the electronic level moves down if the value in **<Tilt L:>** gets bigger and vice versa. If the value for **<Tilt T:>** gets bigger the level moves left and vice versa.
☞	The electronic level never disappears even if the instrument is not level.
2.	When the electronic level is centred, the instrument has been perfectly levelled up.
3.	**CONT (F1)** to exit **STATUS Level & Laser Plummet**.

☞

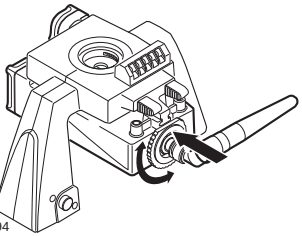
For instruments with two displays:

- The display closer to the circular level shows the movement of the electronic level in the same direction as the movement of the circular level.
- The other display shows the movement of the electronic level in the opposite direction of the circular level movement.

4.3 SmartStation Setup

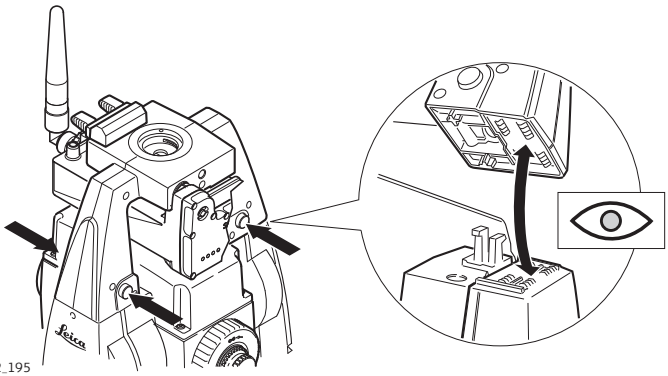
Setup step-by-step

Step	Description
☞	Refer to "4.1 Instrument Setup" for the initial instrument setup onto a tripod. Remove the instrument carry handle by simultaneously pressing and holding-in the four push buttons.



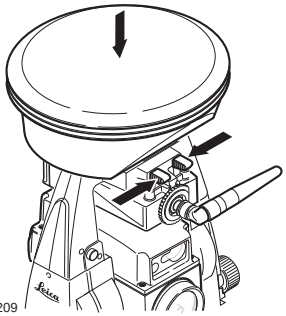
TPS12_194

Step	Description
1.	A circular screw is located at one end of the clip-on-housing. Ensure that the circular screw is in the unlocked position. Turn it anticlockwise, as shown by the lock and arrow symbols on the screw.
2.	Slide the clip-on-housing into position underneath the SmartAntenna Adapter, such that the guide rails on the clip-on-housing and the guide rails on the SmartAntenna Adapter are aligned.
☞	Ensure that the connector located at the end of the clip-on-housing fits into its port of the SmartAntenna Adapter.
3.	Lock the circular screw by turning it clockwise, as shown by the lock and arrow symbols on the screw. The clip-on-housing is now locked into position.
4.	Thread the antenna onto the clip-on-housing.



TPS12_195

Step	Description
5.	Place the SmartAntenna Adapter with attached clip-on-housing onto the instrument by simultaneously pressing and holding-in the four push buttons.
☞	Ensure that the interface connection on the underside of the Smart-Antenna Adapter is on the same side as the Communication side cover.

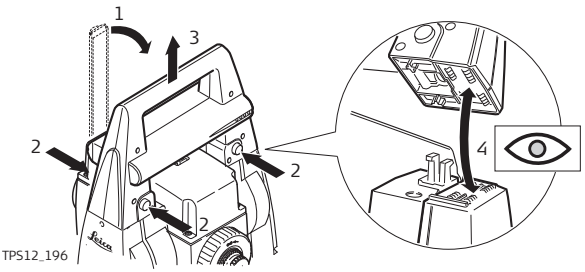


TPS12_209

Step	Description
6.	Place the SmartAntenna onto the SmartAntenna Adapter by simultaneously pressing and holding-in the two press clips.
☞	Ensure that the clip-on-contacts on the underside of the SmartAntenna are aligned to the clip-on-contacts of the SmartAntenna Adapter.

4.4 Instrument Setup for Remote Control

Setup step-by-step



Step	Description
☞	Refer to "4.1 Instrument Setup" for the initial instrument setup onto a tripod. Remove the instrument carry handle by simultaneously pressing and holding-in the four push buttons.
1.	Place the RadioHandle onto the instrument by simultaneously pressing and holding-in the four push buttons.
☞	Ensure that the interface connection on the underside of the RadioHandle is on the same side as the Communication side cover.
2.	Swing the RadioHandle antenna into an upright position.
☞	Refer to "RX1200 User Manual" for further details.

5 Setup, Measure and Record

Description

- The Setup application program is used to define the job settings and to set up and orient the instrument. The routine is accessible from each application program.
- Independent of the chosen Setup application program method, the job settings can be defined in the Begin screen of any application program by moving the focus to **<Job:>** and pressing **ENTER**.

Setup step-by-step

The quickest setup method is described. Refer to "TPS1200+ Applications Field Manual" for further details on additional setup methods.

Step	Description
1.	**PROG** highlight **Setup** and **ENTER** to access **SETUP Station Setup Begin**.
2.	**CONT (F1)** to access **SETUP Station Setup**.
3.	**SETUP Station Setup** Select the job which contains the fixpoints. **<Fixpoint Job:>**. Select the setup method. **<Method: Set Azimuth:>**.
4.	Select the source for the station coordinates. For **<Station Coord: From Job>** and **<Station Coord: Frm Fixpoint Job> CONT (F1)** to access **SETUP Select Station**.
5.	Type in **<Station ID:>** and **<Instrument Ht:>** **CONT (F1)** to access **SETUP Set Stn & Ori - Set Azimuth**.
6.	Aim at the target point and enter the Azimuth and Backsight ID. A distance to the target point may also be measured.
7.	Enter the height of the target point.
8.	Decide whether all angle measurements at the station are to be updated.
☞	**Az=0 (F4)** to set the azimuth to 0.000.
9.	**SET (F1)** to set station and orientation.

Measure and record step-by-step

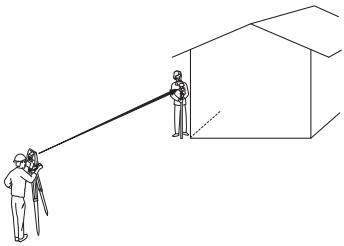
The **SURVEY Survey: Job Name** screen can be accessed from many application programs where point measurement is required. The **ALL (F1)**, **DIST (F2)** and **REC (F3)** keys are used for measuring and storing the point data. The measurement settings depend on the current configuration set.

Step	Description
1.	Refer to paragraph "Setup step-by-step" for information on how to set up the instrument.
2.	Select **Main Menu: Survey**.
3.	**SURVEY Survey Begin** **CONT (F1)** to access **SURVEY Survey: Job Name, Survey** page.

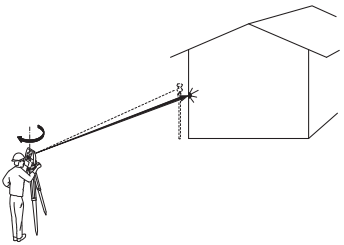
Step	Description
☞	**DIST (F2)** to measure a distance and to display the distance and the angles. The update of the vertical angle after **DIST (F2)** depends on the setting of **<V-Angle:>** in **CONFIGURE Units & Formats, Angle** page. • For **<V-Angle: Hold after Dist>** the vertical angle remains fixed until **REC (F3)** is pressed. • For **<V-Angle: Running>** the vertical angle is continuously updated according to the telescope movement.
☞	**REC (F3)** to store either the displayed distance if measured with **DIST (F2)** and angles or angles and no distance. The displayed point ID is increased according to the active point ID template. After **REC (F3)** is pressed, the distance related values are cleared.
☞	**ALL (F1)** to measure and store distance and angles. The displayed point ID is increased according to the active point ID template. After **ALL (F1)** is pressed, the distance related values are cleared. Pressing **ALL (F1)** works in the same way as pressing **DIST (F2)** and then **REC (F3)**.
4.	**ALL (F1)** to measure distance and angles.

Combining DIST (F2) and REC (F3) step-by-step

The key combination of **DIST (F2)** and **REC (F3)** can be used to measure non accessible points with the reflector, for example building corners.



TPS12_039



TPS12_040

Step	Description
1.	Position the reflector at the same distance from the instrument as the building corner to be measured.
2.	**DIST (F2)** to measure the distance.
3.	**REC (F3)** to store the measured distance to the reflector and the angles to the corner of the house.

☞ For measurements without reflector **<EDM Type: Reflctrless (RL)>** must be set.

☞ For **<EDM Mode: Tracking>**, continuous distance measurements are executed once **ALL (F1)** or **DIST (F2)** is pressed.

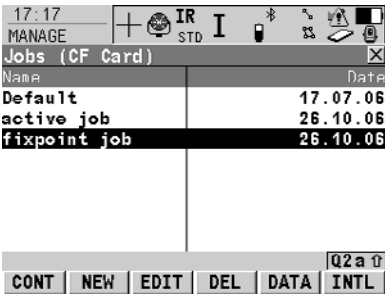
6 Manage... - Getting Started

Accessing MANAGE XX step-by-step

Step	Description
1.	Select **Main Menu: Manage...**.
2.	**TPS1200+ Management** Select an option in the menu.
3.	**CONT (F1)** to access **MANAGE XX**.
☞	**MANAGE XX** can be accessed directly from a choicelist in some screens, for example from the begin screen from an application program.

MANAGE XX

- **MANAGE Jobs (Device)** is shown as an example. Additional softkeys are available on other screens. The listed options are stored in the database DB-X. Any unavailable information is shown as **-----**.
- The screen for **MANAGE Data: Job Name** consists of several pages. The objects listed and their order depend on the active sort and filter settings. An active filter for a page is indicated by ⧩ shown to the right of the name of the page. On the **Lines (X)** page and the **Areas (X)** page, the number in brackets next to the name of the page indicate the number of open lines/areas. Example: **Lines (2)**/**Areas (2)** means that two lines are open.



CONT (F1)
To select an option and to return to the previous screen. For **MANAGE Codelists**, the codes from the highlighted codelist are copied to the active job.

NEW (F2)
To create an option. After storing a new line/area, all existing lines and areas which are open are closed.

EDIT (F3)
To edit the option. For **MANAGE Configuration Sets**, the first screen of the sequential configuration set wizard for the highlighted configuration set is accessed.

DEL (F4)
To delete the option. Available unless **MANAGE Data: Job Name**, **Lines (X)** page and **MANAGE Data: Job Name**, **Areas (X)** page.

DATA (F5)
To view, edit and delete points, lines and areas stored with the job. Points, lines and areas are shown on separate pages. Selected sort and filter settings apply.

CLOSE (F4) and **OPEN (F4)**
To change between the options in the **Open** column for the highlighted line/area. The options are:
Yes: The line/area is open. Measured points are assigned to the line/area.
No: The line/area is closed. Measured points are not assigned to the line/area.

MORE (F5)
To display more information in the second column. Available unless **MANAGE Jobs (Device)**.

PAGE (F6)
To change to another page on this screen. Available for **MANAGE Data: Job Name**.

CFCRD (F6) or **INTL (F6)**
To change between viewing jobs stored on the CompactFlash card or internal memory. Available for **MANAGE Jobs**. Available for instruments with internal memory.

SHIFT LOG (F4)
To view points, lines, areas and free codes stored with the job sorted by time. Available for **MANAGE Data: Job Name, Points** page.

SHIFT DEL (F4)
To delete the line/area. Available for **MANAGE Data: Job Name**, **Lines (X)** page and **MANAGE Data: Job Name**, **Areas (X)** page.

SHIFT SET-D (F4)
To turn the highlighted coordinate system/configuration set into a user defined default coordinate system/configuration set stored in the instrument. Available for **MANAGE Coordinate Systems** and **MANAGE Configuration Sets**. Available unless a default coordinate system/configuration set is highlighted.

SHIFT FILT (F5)
To define sort and filter settings. Available for **MANAGE Data: Job Name**.

SHIFT DEFLT (F5)
To recall the deleted default coordinate systems/configuration sets and to reset default configuration sets to the default settings. Available for **MANAGE Coordinate Systems** and **MANAGE Configuration Sets**.

Next step

IF an option	THEN
is to be selected	highlight the desired option. **CONT (F1)** closes the screen and returns to the screen from where **MANAGE XX** was accessed.
is to be created or edited	highlight the option and **NEW (F2)**/**EDIT (F3)**. Refer to the individual chapters.

7 Manage...\Jobs

7.1 Overview

Description

Jobs:

- structure surveying projects.
- contain all points, lines, areas and codes that are recorded and stored.
- can be downloaded to LGO for post-processing or for data transfer to a further program.
- can be uploaded from LGO, for example for stakeout operations.
- may be stored on the CompactFlash card or internal memory, if fitted.

When a job becomes active, then the sort and filter settings of this job are saved in the SystemRAM. If the CompactFlash card is formatted then these last used sort and filter settings are used for the job **Default**.

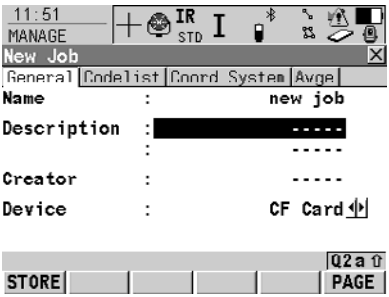
7.2 Creating a New Job/Editing a Job

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Jobs (Device)**.
2.	In **MANAGE Jobs (Device)** highlight a job. When creating a new job, the settings, including sort and filter settings, of this job are applied to the new job, the codelist must be selected.
3.	**NEW (F2)/EDIT (F3)** to access **MANAGE New Job/MANAGE Edit Job**.

Editing jobs is similar to creating a new job. For simplicity, the screens are called **MANAGE XX Job** and differences are clearly outlined.

MANAGE XX Job, General page



STORE (F1)
To store the settings and to return to **MANAGE Jobs (Device)**.

DATA (F5)
Available for editing a job. To view, edit and delete points, lines and areas stored with the job. Points, lines and areas are shown on separate pages. Selected sort and filter settings apply.

SHIFT LOG (F5)
Available for editing a job. To view, edit and delete points, lines and areas stored with the job. Points, lines and areas are sorted by time in one list.

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the new job. The name may be up to 16 characters long and may include spaces. Input required.
<Description:>	User input	Two lines for a detailed description of the job. This can be for example, work to be performed or the classes contained in the job. Input optional.
<Creator:>	User input	The person's name who is creating/editing the job. Input optional.
<Device:>		The device on which the job will be stored.
	Choicelist	For instruments with internal memory.
	Output	For instruments without internal memory and when editing a job.

Next step
PAGE (F6) changes to the **Codelist** page.

MANAGE
XX Job,
Codelist page

STORE (F1)
To store the settings and to return to **MANAGE Jobs (Device)**.

IMPRT (F2)
Available for editing a job. To add additional codes from a new codelist to the job. The name of this codelist is copied to the job.

CODES (F4)
Available for editing a job. To view, edit, delete, sort and group codes currently stored in the job. The functionality of this screen is mainly the same as for **MANAGE Codes**.

DATA (F5)
To view, edit and delete points, lines and areas stored with the job. Points, lines and areas are shown on separate pages. Selected sort and filter settings apply.

SHIFT EXPRT (F2)
Available for editing a job. To copy codes from the job to an existing or new codelist.

Description of fields

Field	Option	Description
<Codelist:>	Choicelist	Available for creating a new job or for editing a job if no codes are stored in the job. Choosing a codelist copies the codes to the job.
	Output	Available for editing a job if codes are stored in the job. If codes had been copied from a System RAM codelist, then the name of the codelist is displayed. If codes have not been copied from a System RAM codelist but typed in manually, then the name of the active job is displayed.

Next step
PAGE (F6) changes to the **Coord System** page.

MANAGE XX Job Coord System page

Choosing a coordinate system attaches it to the job. All other fields on this screen are output fields. They depend on the transformation type of the selected coordinate system.

Next step
PAGE (F6) changes to the **Avge** page.

MANAGE XX Job Avge page

In order to check measurements, the same point can be measured more than once. If activated, an average or an absolute difference is calculated. Refer to paragraph "MANAGE XX Job, General page" for information on the softkeys.

Description of fields

Field	Option	Description
<Averaging Mode:>		Defines the averaging principles for multiple measured points.
	Average	Computes the average for the position and the height. Points exceeding the defined limits are marked with ? in **MANAGE Edit Point**, **Mean** page.
	Absolute Diffs	Computes the absolute differences between two points selected from a list of measured points which are all stored with the same point ID.
	Off	Averaging is turned off.
<Method:>		Available for **<Averaging Mode: Average>**. The method used for computing the average.
	Weighted	Computes a weighted average.
	No Weighting	Computes an arithmetic average.
<Points to Use:>	Choicelist	The type of points which will be taken into account for averaging or for absolute differences.
<Avge Limit Pos:> and **<Avge Limit Ht:>**	User input	Available for **<Averaging Mode: Average>**. The acceptable difference for the position and height components.
From **<Easting:>** to **<Cartesian Z:>**	User input	Available for **<Averaging Mode: Absolute Diffs>.** The acceptable absolute differences for each coordinate component.

Next step
STORE (F1) stores the job and returns to **MANAGE Jobs (Device)**.

8 Manage...\Data

8.1 Overview

Description

- Data is a generic term for points, lines and areas.
- Data management is the administration of data stored in the active job, including
  - viewing data with their related information.
  - editing data.
  - creating new data.
  - deleting existing data.
  - filtering existing data.

Objects

Objects:

- are points, lines and areas.
- have a unique identification ID. This is the point ID, the line ID and the area ID.
- may or may not have a code attached. This is a point code for a point, a line code for a line and an area code for an area.

8.2 Point Management

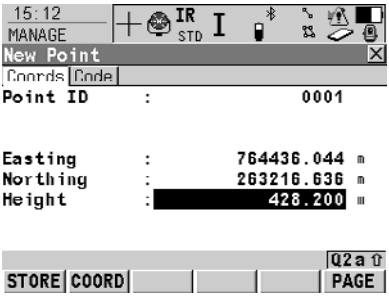
8.2.1 Creating a New Point/Editing a Point

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Data: Job Name**, **Points** page
2.	**MANAGE Data: Job Name**, **Points** page If a point is to be edited, then highlight the point.
3.	**NEW (F2)/EDIT (F3)** to access **MANAGE New Point/MANAGE Edit Point: Point ID**.

Editing points is similar to creating a new point. For simplicity, the screens are called **MANAGE XX Point** and differences are clearly outlined. If editing a point, then the visible pages and softkeys on this screen depend on the properties of the point being edited.

MANAGE XX Point, Coords page



STORE (F1)
To store the point and all associated information and to return to **MANAGE Data: Job Name, Points** page.

COORD (F2)
To view other coordinate types.

NORTH (F3) or **SOUTH (F3)**
Available for local geodetic or WGS 1984 geodetic coordinates when **<Local Lat:>** or **<WGS 1984 Lat:>** is highlighted. To change between North and South latitude.

EAST (F3) or **WEST (F3)**
Available for local geodetic or WGS 1984 geodetic coordinates when **<Local Long:>** or **<WGS 1984 Long:>** is highlighted. To change between East and West longitude.

SHIFT ELL H (F2) or **SHIFT ORTH (F2)**
Available for local coordinates. To change between the ellipsoidal and the orthometric height.

SHIFT INDIV (F5) or **SHIFT RUN (F5)**
To change between entering an individual point ID different to the defined ID template and the running point ID according to the ID template.

Description of fields

Field	Option	Description
<Point ID:>	User input	The name of the new point. The configured point ID template is used. The ID can be changed. • To start a new sequence of point ID's overtype the point ID. • For an individual point ID independent of the ID template **SHIFT INDIV (F5)**. **SHIFT RUN (F5)** changes back to the next free ID from the configured ID template. If editing a point, then changing the point ID for a point of any class applies this new point ID to all other points with the same original name, regardless of class.
	Output	Points of **<Class: REF>** cannot be renamed.
Coordinates	User input	Negative geodetic coordinates are interpreted as being of the opposite hemisphere or other side of the central meridian. For example, entering -25 °N will be stored as 25 °S, entering -33 °E will be stored as 33 °W.
	Output	If editing, then points of **<Class: REF>** cannot be renamed.

Next step
PAGE (F6) changes to the next page. Refer to the relevant paragraph below.

MANAGE
Edit Point: Point ID, Obs page

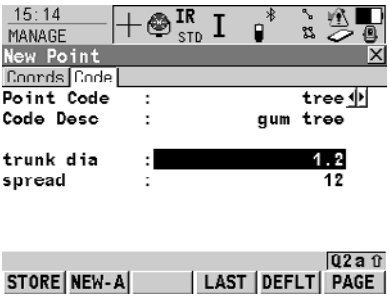
For GNSS points
The name of the real-time reference station from where the GNSS point was measured, the name of antenna used to measure the point and the baseline values are shown in output fields.

For TPS points
It is possible to edit the reflector height. Changing the reflector height recalculates the point height. The name of the station from where the point was measured is shown in an output field. The distance variables **Δ**Hz, **Δ**V, **Δ**Slop Dist are shown in an output field, whenever a measurement has been taken in both faces.

Next step
PAGE (F6) changes to the next page. Refer to the relevant paragraph below.

MANAGE XX Point, Code page

The setting for **<Thematc Codes:>** in **CONFIGURE Coding Settings** determines the availability of the subsequent fields and softkeys. For **<Thematc Codes: Without Codelist>** none of the keys is available except for **STORE (F1)**.



STORE (F1)
To store the point and all associated information and to return to **MANAGE Data: Job Name, Points** page.

NEW-A (F2)
To create additional attributes for the point code.

NAME (F3) or **VALUE (F3)**
Available for attributes for which an attribute name can be typed in. To highlight **<Attribute n:>** or the field for the attribute value. The name of **<Attribute n:>** can be edited and an attribute value can be typed in.

LAST (F4)
To recall the last used attribute values which were stored with this point code.

DEFLT (F5)
To recall the default attribute values for the selected code.

Description of fields

Field	Option	Description
<Point Code:>	Choicelist	Available for **<Thematc Codes: With Codelist>**. All point codes of the job codelist can be selected. The description of the code is shown as an output field. The attributes are shown as output, input or choicelist fields depending on their definition.
<Code:>	User input	Available for **<Thematc Codes: Without Codelist>**. The code to be stored with the point. A check is performed to see if a point code of this name already exists in the job. If so, the according attributes are shown.
<Attribute n:>	User input	Available for **<Thematc Codes: Without Codelist>.** Up to eight attribute values are available.

Next step

IF	THEN
creating a point	**STORE (F1)** stores the point and all associated information and returns to **MANAGE Data: Job Name, Points** page.
editing a point	• **PAGE (F6)** changes to the **Annots** page, if available. • **PAGE (F6)** changes to the **Mean** page, if available. Refer to "8.2.2 Mean Page" for information on softkeys and fields on the **Mean** page.

MANAGE
Edit Point: Point ID, Annots page

The comments to be stored with the point can be edited except for **<4:>** if a GPS seismic value has been recorded.

Next step

STORE (F1) stores the changes and returns to **MANAGE Data: Job Name**.

8.2.2 Mean Page

Description

- Various measured coordinate triplets for one point can be recorded using the same point ID. If the averaging mode is activated, an average is calculated.
- It is checked if the deviations of each single point are within the configured limits.
- After averaging, the **Mean** page becomes available in **MANAGE Edit Point: Point ID** and accessible from the Survey application program **SURVEY Survey: Job Name, Survey** page.

Averaging

Defining the averaging mode and configuring the limits

The averaging mode and the limits are configured in **MANAGE New Job, Avge** page or in **MANAGE Edit Job: Job Name, Avge** page. Refer to "7.2 Creating a New Job/Editing a Job" for further details.

Description of averaging modes

Averaging mode	Description
Average	The horizontal and height distances from the measured points to the average are computed and displayed on the **Mean** page. Depending on the selected averaging method, the average will be computed weighted or arithmetic (no weighting).
Absolute Diffs	The same as for **Average** above applies for **Absolute Diffs.** Additionally, the **absolute difference** between two points selected from a list of measured points which are all stored with the same point ID are computed and checked for being within the defined limits.
Off	Averaging functionality is turned off.

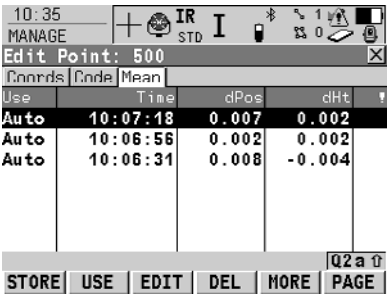
Access step-by-step

Access within data management

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Data: Job Name**.
2.	In **MANAGE Data: Job Name**, **Points** page highlight a point to be edited.
3.	**EDIT (F3)** to access **MANAGE Edit Point: Point ID, Mean** page.

MANAGE
Edit Point: Point ID, Mean page

All measured coordinate triplets recorded using the same point ID are shown.



STORE (F1)
To store the changes and to return to the screen from where this screen was accessed.

USE (F2)
To include or exclude the highlighted coordinate triplet in or from the calculation of the average.

EDIT (F3)
To view and edit the highlighted measured coordinate triplet.

DEL (F4)
To delete the highlighted coordinate triplet. The average is recomputed.

MORE (F5)
To display more information in the second column.

SHIFT DIFFS (F5)
Available for **<Averaging Mode: Absolute Diffs>** and **Yes** is set in the **Use** column for exactly two measurements. To display the absolute coordinate differences. Differences exceeding the defined limit are indicated by !.

Description of columns

Column	Description
Use	The use of a measured coordinate triplet in the averaging. • **Auto** The coordinate triplet is included in the averaging computation if within the defined averaging limit. • **Yes** The coordinate triplet is always included in the averaging computation even if it would fall outside the defined averaging limit. • **No** The coordinate triplet is never included in the averaging computation. • ----- The coordinate triplet cannot be included in the averaging computation. Automatically set by the system. **USE (F2)** changes between the options.
dPos	The horizontal distance from the measured coordinate triplet to the average.

Column	Description
dHt	The height distance from the measured coordinate triplet to the average.
!	Available for measured coordinate triplets with **Auto** or **Yes** in the **Use** column if **<Averaging Mode: Average>**. Indicates an exceeding of the limits.

Next step

IF a measured coordinate triplet	THEN
is not to be viewed	**STORE (F1)** stores the changes and returns to **MANAGE Data: Job Name**.
is to be viewed	highlight a measured coordinate triplet and **EDIT (F3)**. ☞ Codes cannot be changed. A change in codes must be an overall change for the average point.

8.3 Line/Area Management

8.3.1 Overview

Description

- A line/area consists of points and can be created/edited in **MANAGE Data: Job Name**. The individual points are measured within any application program. These can be all points, except auxillary points. Points can be simultaneously assigned to one or more lines and/or areas.
- A line/area can have:
  - a style for display in MapView.
  - a code independent of the point code of the points comprising the line/area.

Points are assigned to a line/area when the line/area is open. Press **USE (F4)** to open/close a line/area.

8.3.2 Creating a New Line/Area/Editing a Line/Area

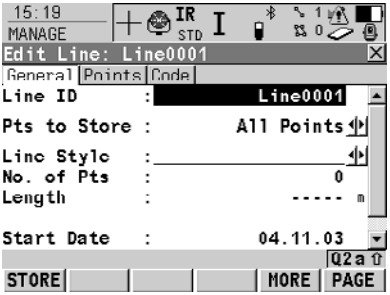
Creating/editing lines/areas and the functionality of all screens and fields are similar for lines/areas. For simplicity, only the creation/editing of a line is explained in this chapter.

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Data: Job Name**.
2.	**PAGE (F6)** until the **Lines (X)** page is active.
3.	**MANAGE Data: Job Name**, **Lines (X)** page If a line is to be edited, then highlight the line.
4.	**NEW (F2)**/**EDIT (F3)** to access **MANAGE New Line**/**MANAGE Edit Line: Line ID**.

Editing lines/areas is similar to creating a new line/area. For simplicity, the screens are called **MANAGE XX Line** and differences are clearly outlined.

MANAGE XX Line, General page



STORE (F1)
To store the line and all associated information and to return to **MANAGE Data: Job Name, Lines (X)** page. Any existing lines and areas which are open are closed.

MORE (F5)
Available on **MANAGE Edit Line: Line ID**. To display additional fields with more information.

SHIFT INDIV (F5) or **SHIFT RUN (F5)**
To change between entering an individual line ID different to the defined ID template and the running line ID according to the ID template.

Description of fields

Field	Option	Description
<Line ID:>	User input	The name of the new line.
<Pts to Store:>	**All Points**, **Only Msd Pts**, **Only Auto Pts**, **Only Offset1 Pts** or **Only Offset2 Pts**	The type of points which are used to form the line during a survey.

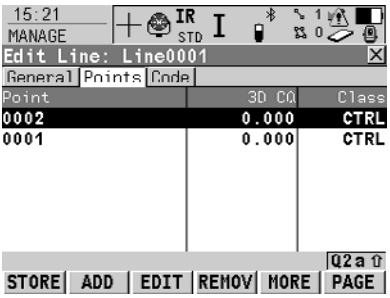
Field	Option	Description
<Line Style:>	Choicelist	Available on **MANAGE New Line.** This is the line style in which lines/areas are represented in MapView and LGO. For **<Line Code: <None>>** on the **Code** page a line style can be selected from a choicelist. Otherwise the line style as defined for the selected line code on the Code page is shown.
<No. of Pts:>	Output	The number of points contained within the line.
<Length:>	Output	Available on **MANAGE Edit Line: Line ID**. The sum of the distances between the points in the sequential order in which they are stored for the line. This can be a horizontal grid distance or a geodetic distance on the WGS 1984 ellipsoid.
<Start Time:> and **<Start Date:>**	Output	Available on **MANAGE Edit Line: Line ID**. The time/date when the line was created.
<End Time:> and **<End Date:>**	Output	Available on **MANAGE Edit Line: Line ID** after pressing **MORE (F5)**. The time/date when the last point was added to the line. The values do not change after deleting the last added point or after editing unless an additional point is added to the line.

Next step

IF	THEN
creating a line	**PAGE (F6)** changes to the **Code** page. Refer to paragraph "MANAGE XX Line, Code page".
editing a line	**PAGE (F6)** changes to the **Points** page. Refer to paragraph "MANAGE Edit Line: Line ID, Points page".

MANAGE
Edit Line: Line ID, Points page

All points belonging to the line are listed. The point that was added last to the line is at the top of the list.



ADD (F2)
To add an existing point from the active job to the line. A new point is added before the point which was highlighted when **ADD (F2)** was pressed.

EDIT (F3)
To edit the highlighted point from the line.

REMOV (F4)
To remove the highlighted point from the line. The point itself is not deleted.

MORE (F5)
To display more information in the second column.

Next step
PAGE (F6) changes to the **Code** page.

MANAGE
XX Line, Code page

The functionality is very similar to **MANAGE New Point, Code** page. Refer to "8.2.1 Creating a New Point/Editing a Point".

Next step
STORE (F1) stores the changes and returns to **MANAGE Data: Job Name, Lines (X)** page.

Creating lines/areas most efficiently

IF the task is to create	THEN
multiple lines/areas with subsequent line/area ID's	use the hot key/user menu function **FUNC Create New Line (Quick)**/**FUNC Create New Area (Quick)**. Pressing the hot key or selecting the function from the user menu creates and immediately stores the new line/area. For the line/area ID, the line/area ID template as defined in **CONFIGURE ID Templates** is used. The code and attributes are taken over from the last created line/area.
lines/areas with certain codes	use quick coding. The job codelist must contain quick codes for lines/areas. By tying the quick code a new line/area is created and immediately stored with that line/area code and attributes. For the line/area ID, the line/area ID template as defined in **CONFIGURE ID Templates** is used.

8.4 Point Sorting and Filters

8.4.1 Sorting and Filters for Points, Lines and Areas

Description

The sort settings define the order of the objects in the active job. The filter settings define the objects to be viewed.

☞ An active filter for an object is indicated in **MANAGE Data: Job Name** by ▼ located on the right hand side of the page name.

☞ The sort and filter settings are stored in the job. They are remembered after turning off the instrument and are copied to a new job.
When a job becomes active, then the sort and filter settings of this job are saved in the SystemRAM. If the CompactFlash card is formatted then these last used sort and filter settings are used for the job **Default**.

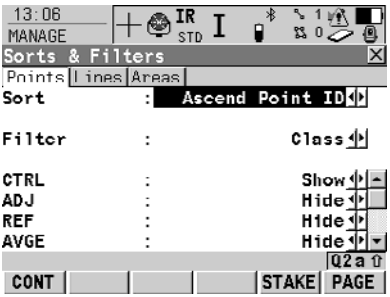
Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Data: Job Name**.
2.	In **MANAGE Data: Job Name** on the **Points**, **Lines (X)** or **Areas (X)** page, **SHIFT FILT (F5)** to access **MANAGE Sorts & Filters**.
3.	**MANAGE Sorts & Filters** The page for an object is displayed when the equivalent page is displayed in **MANAGE Data: Job Name**.

☞ The functionality on the **Lines (X)** and **Areas (X)** page is similar to that on the **Points** page. For simplicity, only the **Points** page is described.

MANAGE Sorts & Filters, Points page

The available fields on this screen depend on the selected setting for **<Filter:>**.



CONT (F1)
To close the screen and return to the screen from where this screen was accessed.

STAKE (F5)
To filter points for the Stakeout application program.

Description of fields

Field	Option	Description
<Sort:>	**Ascend Point ID**, **Descend Point ID**, **Forward Time** or **Backward Time**	Always available. The method by which points are sorted.

Field	Option	Description
<Filter:>		Always available. The method the points are filtered by.
	No Filter	Shows all points.
	Highest Class	Shows points of highest class.
	Range of Pt ID's	Shows points with point ID's between the entered start and end ID. The points are left aligned and sorted by the first digit.
	Pt ID Wildcard	Shows points with point ID's matching the wildcard. * and ? are supported. * indicates an undefined number of unknown characters. ? indicates a single unknown character.
	Time	Shows points which were recorded within a defined time window.
	Class	Shows points of the selected class.
	Instrument	Shows points originating from the selected instrument or software program type.
	Coordinate Type	Shows points of the selected type of coordinates.
	Point Code	Shows points with selected codes attached.
	Radius From Pt	Shows points within the defined radius from a particular point. The radius is the horizontal distance.
	Individual Line	Shows points forming a selected line. This may for example be useful during stakeout.
	Individual Area	Shows points forming a selected area. This may for example be useful during stakeout.

Next step

CONT (F1) returns to the screen from where **MANAGE Sorts & Filters** was accessed.

8.4.2 Point, Line and Area Code Filter

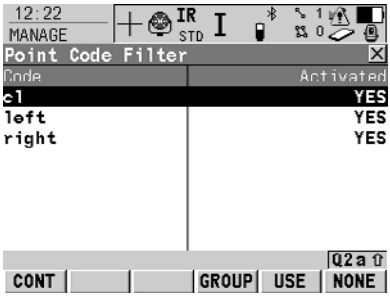
For each object, a code filter exists. The point, line and area code filters are independent from each other. The functionality is identical. For simplicity, the point code filter is explained.

Access step-by-step

Step	Description
1.	Refer to "8.4.1 Sorting and Filters for Points, Lines and Areas" to access **MANAGE Sorts & Filters**.
2.	**MANAGE Sorts & Filters** **<Filter: Point Code>.**
3.	**CODES (F4)** to access **MANAGE Point Code Filter**.

MANAGE Point Code Filter

This screen shows the point codes from the active job and codes currently used as filter.



CONT (F1)
To close the screen and return to the screen from where this screen was accessed.

GROUP (F4)
To activate and deactivate code groups. Codes belonging to a deactivated code group are not displayed in **MANAGE Code Filter**.

USE (F5)
To activate and deactivate the filter for the highlighted code.

NONE (F6) or **ALL (F6)**
To deactivate or activate all point codes.

SHIFT SORT (F5)
To define the order of the codes.

9 Manage...\Codelists

9.1 Creating a New Codelist/Editing a Codelist

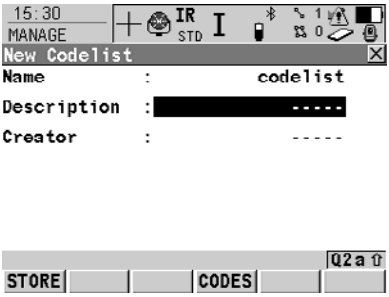
It is recommended to create a codelist in LGO. A codelist can be transferred from LGO to the System RAM of the instrument using the CompactFlash card.

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Codelists**.
2.	**NEW (F2)**/**EDIT (F3)** to access **MANAGE New Codelist**/**MANAGE Edit Codelist**.

Editing codelists is similar to creating a new codelist. For simplicity, the screens are called **MANAGE XX Codelist** and differences are clearly outlined.

MANAGE XX Codelist



STORE (F1)
To store the codelist and to return to **MANAGE Codelists**.

CODES (F4)
To access **MANAGE Codes** where codes can be created, edited or deleted and code groups can be accessed.

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the codelist. The name may be up to 16 characters long and may include spaces. Input required.
<Description:>	User input	A detailed description of the codelist. This can be for example, work to be performed. Input optional.
<Creator:>	User input	The person's name who is creating the new codelist. Input optional.

Next step

STORE (F1) stores the codelist and returns to **MANAGE Codelists**.

9.2 Creating a New Code/Editing a Code

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Codelists**.
2.	In **MANAGE Codelists** highlight the codelist of which codes are to be managed.
3.	**EDIT (F3)** to access **MANAGE Edit Codelist**.
4.	**CODES (F4)** to access **MANAGE Codes**.
5.	**MANAGE Codes** Codes from currently active code groups are shown. The indicates codes which have attributes attached.
☞	**MORE (F5)** displays information about the code description, the quick codes if available, the code groups and the code type.
☞	**SHIFT GROUP (F4)** To view, create, delete, activate and deactivate code groups.
☞	**SHIFT SORT (F5)** sorts codes by code name, code description, quick code or the last use.
6.	**MANAGE Codes** If a code is to be edited, then highlight the code.
7.	**NEW (F2)/EDIT (F3)** to access **MANAGE New Code/MANAGE Edit Code**.

☞ Editing codes is similar to creating a new code. For simplicity, the screens are called **MANAGE XX Code** and differences are clearly outlined.

☞ SmartCodes is basically a quick way for code to be selected and point to be measured. For information on configuring and using SmartCodes refer to TPS1200+ Technical Reference Manual.

MANAGE XX Code

STORE (F1)
To add the new code and any associated attributes to the System RAM codelist and returns to the screen from where this screen was accessed.

NEW-A (F2)
To add a new input field for an attribute of attribute type normal and of value type text. Attributes of attribute type mandatory or fixed and of value type real or integer must be created in LGO. Up to twenty attributes can be created.

NAME (F3) or **VALUE (F3)**
Available for attributes for which an attribute name can be typed in. To highlight the field for the attribute name or the field for the attribute value. The attribute name can be edited and the attribute value to be used as the default attribute value can be typed in.

Description of fields

Field	Option	Description
<Code:>	User input	A unique name for the new code. The name may be up to 16 characters long and may include spaces. Input required.
<Code Desc:>	User input	A detailed description of the code. This can be for example the full designation if **<Code:>** is an abbreviation. Input optional.
<Group:>	Choicelist	The code group to which the code is to be assigned.
<Code Type:>	Choicelist	Defines the use of the code. It can be used as thematical code for points, lines or areas or as a free code. It makes a code unique. For example **<Code: Oak>** can have **<Code Type: Point>**, **<Code Type: Line>**, **<Code Type: Area>** and/or **<Code Type: Free>** within the same codelist and job.
<Linework:>	Choicelist	Available for **<Code Type: Point>** only. This field allows a new line or new area to be opened whenever the point code is newly selected. This functionality is also available when creating codelists with LGO Codelist Management.
	None	Select this option to disable the functionality. All other code settings on the instrument are not affected when this option is set.

Field	Option	Description
	Begin Line	When a point code is newly selected, a new line is opened and the point being stored is added to the line. When the same point code remains selected, a new line is not opened. The point being stored is simply added to the current line.
	Begin Area	The behaviour for opening a new area is the same as the behaviour for opening a new line, as mentioned above.
<Line Style:>	Choicelist	Not available for **<Code Type: Free>**. The style in which lines and areas are represented in MapView and LGO.

Next step
STORE (F1) adds the code to the codelist/stores the changes and returns to **MANAGE Codelists**.

10 Linework

10.1 Performing Linework

The Survey application program is used here to explain Linework.

Requirements

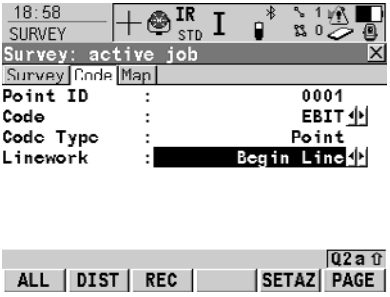
- A display mask with a choicelist for Linework must be configured.
- The flags for Linework must be defined in **CONFIGURE Coding & Linework Settings**, **Linework** page.

Access step-by-step

Step	Description
1.	Select **Main Menu: Survey** to access **SURVEY Survey Begin**.
2.	In **SURVEY Survey Begin** select a job.
3.	Select a configuration set.
4.	Select an reflector.
5.	**CONT (F1)** to access **SURVEY Survey: Job Name**.

SURVEY Survey: Job Name, Survey page

The most important keys are explained.



ALL (F1)
To measure and store distances and angles.

STOP (F1)
Available if **<EDM Mode: Tracking>** and **DIST (F2)** was pressed. Stops the distance measurements. **(F1)** changes back to **ALL**.

DIST (F2)
To measure and display distances. Available unless **<EDM Mode: Tracking>** and/or **<Log Auto Pts: Yes>**, after the tracking or logging is started.

REC (F3)
To record data. If **<EDM Mode: Tracking>** and/or **<Log Auto Pts: Yes>**, records measured point and continues tracking.

Description of fields

Field	Option	Description
<Point ID:>	User input	The identifier for manually occupied points. The configured point ID template is used. The ID can be changed in the following ways:

Field	Option	Description
		• To start a new sequence of point ID's type over the point ID. • For an individual point ID independent of the ID template **SHIFT INDIV (F5)**. **SHIFT RUN (F5)** changes back to the next ID from the configured ID template.
<Linework:>		The linework flag to be stored with the point.
	- - - - -	No linework flag is stored.
	Begin Line	Opens a new line when the next point is stored. Any line/area which is currently open is closed and the last point belonging to that line/area is given the **End Line**/**Close Area** linework flag. The point may or may not be stored with a point code.
	3pt Curve	Stores the linework flag for a curve through three points and continues a line/area.
	ReOpen Any Line	Opens a line from a list of all lines which are currently stored in the job when the next point is stored. The last code used with the reopened line is automatically selected when the point is stored. Any line/area which is currently open is closed and the last point belonging to that line/area is given the **End Line**/**Close Area** linework flag.
	ReOpen Last Line	Opens the last used line again. The last code used with the reopened line is automatically selected when the point is stored.
	End Line	Closes all open lines.
	Cont Line/Area	Indicates a line/area is open.
	Start Spline	Stores the linework flag for beginning a spline and continues any open line/area.
	End Spline	Closes a spline and continues any open line/area.
	Cont Spline	Indicates a line/area is open with spline line type.

Field	Option	Description
	Begin Area	Opens a new area when the next point is stored. Any line/area which is currently open is closed and the last point belonging to that line/area is given the **End Line**/**Close Area** linework flag. The point may or may not be stored with a point code.
	ReOpen Any Area	Opens an area from a list of all lines which are currently stored in the job when the next point is stored. The last code used with the reopened area is automatically selected when the point is stored. Any line/area which is currently open is closed and the last point belonging to that line/area is given the **End Line**/**Close Area** linework flag.
	ReOpen Last Area	Opens the last used area again. The last code used with the reopened area is automatically selected when the point is stored.
	Close Area	Closes all open areas.

Next step

Step	Description
1.	Go to the point to be occupied.
2.	Select the linework flag to be stored with the next point.
3.	**ALL (F1)**
☞	Depending on the option selected for **<Linework:>**, a line/area is opened, closed or re-opened.
4.	Repeat steps 1. to 3. until all points are occupied.
5.	**SHIFT QUIT (F6)** to exit the Survey application program.
6.	Use a format file to export the points including the linework flags.

10.2 Combining Linework and Coding

Description

Combining Linework and coding can only be configured if thematical point codes or if thematical point, line and area codes are available for selection. Thematical coding can be done with or without codelists.

Requirements

- A display mask must be configured with:
  - a field for codes.
  - a choicelist for Linework.
- The configuration of a field for code types in a display mask is required for working with point, line and area codes without choicelist. Else the configuration of a field for code types is optional.
- Configure in **CONFIGURE Coding & Linework**, **Coding** page
  - **<Show Codes: Only Pt Codes>** or **<Show Codes: All Codes>**.
  - **<Thematc Codes: With Codelist>** or **<Thematc Codes: Without Codelist>**.
- In **CONFIGURE Coding & Linework Settings**, **Linework** page define the flags for Linework.

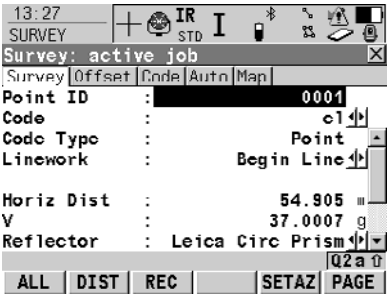
The Survey application program is used here to explain the combination of Linework and coding.

Access step-by-step

Step	Description
1.	Select **Main Menu: Survey** to access **SURVEY Survey Begin**.
2.	In **SURVEY Survey Begin** select a job.
3.	Select a configuration set.
4.	Select an reflector.
5.	**CONT (F1)** to access **SURVEY Survey: Job Name**.

SURVEY Survey: Job Name, Survey page

This is what a display mask configured for Linework and coding looks like. The most important keys are explained.



ALL (F1)
To measure and store distances and angles.

STOP (F1)
Available if **<EDM Mode: Tracking>** and **DIST (F2)** was pressed. Stops the distance measurements. **(F1)** changes back to **ALL**.

DIST (F2)
To measure and display distances. Available unless **<EDM Mode: Tracking>** and/or **<Log Auto Pts: Yes>**, after the tracking or logging is started.

REC (F3)
To record data. If **<EDM Mode: Tracking>** and/or **<Log Auto Pts: Yes>**, records measured point and continues tracking.

Linework and coding step-by-step

These step-by-step instructions refer to the previous screen.

For <Show Codes: Only Pt Codes>

Step	Field	Description for thematical coding	
		With codelist	**Without codelist**
1.	**<Code:>**	Select a code from the choicelist. Only point codes are available for selection.	Type in a code.
☞		**<None>** to store a point without code or to perform Linework without coding.	**-----** to store a point without code or to perform Linework without coding.
2.	**<Code Type:>**	**Point** is displayed. This field is an output field. It can not be changed.	
3.	**<Linework:>**	Select an option for the Linework flag to be stored with the point.	
☞		**-----** to store a point without Linework flag or to perform coding without Linework.	
4.	-	**ALL (F1)**	
☞	-	• The point is stored with the selected code.	
	-	• Depending on the selection for **<Linework:>**, a line/area is opened/closed.	

For <Show Codes: All Codes>

Step	Field	Description for thematical coding	
		With codelist	**Without codelist**
1.	**<Code:>**	Select a code from the choicelist. Point, line and area codes are available for selection.	Type in a code.
☞		**<None>** to store a point without code or to perform Linework without coding.	**-----** to store a point without code or to perform Linework without coding.

Step	Field	Description for thematical coding	
		With codelist	**Without codelist**
2.	**<Code Type:>**	The type of the selected code. This field is an output field. It can not be changed.	Select the type of the entered code.
3.	**<Linework:>**	Select an option for the Linework flag to be stored with the point. **-----** to store a point without Linework.	
4.	-	**ALL (F1)**	
	- - -	• If a point code was selected, the point is stored with the selected code. • If a line/area code was selected, the point is stored as part of the line/area. • Depending on the selection for **<Linework:>**, a line/area is opened/closed.	

11 Manage...\Coordinate Systems

11.1 Overview

Description

A coordinate system:

- consists of up to five elements.
- allows the conversion from WGS 1984 geodetic or cartesian coordinates to local cartesian, geodetic or grid coordinates and back.

Elements of coordinate system

The five elements which define a coordinate system are:

- a transformation
- a projection
- an ellipsoid
- a geoid model
- a **C**ountry **S**pecific **C**oordinate **S**ystem model

11.2 Creating a New Coordinate System/Editing a Coordinate System

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Coordinate Systems**.
2.	In **MANAGE Coordinate Systems** highlight a coordinate system. When creating a new coordinate system, a copy of this coordinate system is taken for further configurations.
3.	**NEW (F2)/EDIT (F3)** to access **MANAGE New Coordinate System/MANAGE Edit Coordinate System**.

Editing a coordinate system is similar to creating a new coordinate system. For simplicity, the screens are called **MANAGE XX Coordinate System** and differences are clearly outlined.

MANAGE XX Coordinate System

When editing a coordinate system the transformation type of the selected coordinate system determines the availability and the options of the subsequent fields. Most fields are identical with those for the creation of a new coordinate system.

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the coordinate system. The name may be up to 16 characters long and may include spaces.
<Residuals:>		Available for transformations with control points. The method by which residuals are distributed throughout the transformation area.
	None	No distribution is made. Residuals remain with their associated points.
	1/Distance^{XX}	Distributes the residuals according to the distance between each control point and the newly transformed point.
	Multiquadratic	Distributes the residuals using a multi-quadratic interpolation approach.
<Transform:>	Choicelist	The type of transformation.
<PreTransform:>	Output	Available for editing Twostep transformations. The name of a preliminary 3D transformation which is used together with the selected projection to obtain preliminary grid coordinates to be used for a final 2D transformation.
<Ellipsoid:>	Choicelist	Available unless projection **<Type: Customised>**. The local coordinates are based on this ellipsoid.

Field	Option	Description
<Projection:>	Choicelist	The map projection.
<Geoid Model:>	Choicelist	The geoid model.
<CSCS Model:>	Choicelist	The Country Specific Coordinate System model.

Next step
STORE (F1) stores the coordinate system and returns to **MANAGE Coordinate Systems**.

11.3 Transformations/Ellipsoids/Projections

11.3.1 Accessing Transformation/Ellipsoid/Projection Management

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Coordinate Systems**.
2.	In **MANAGE Coordinate Systems** highlight a coordinate system to be edited.
3.	**EDIT (F3)** to access **MANAGE Edit Coordinate System**.
4.	In **MANAGE Edit Coordinate System** highlight **<Transform:>**, **<Ellipsoid:>** or **<Projection:>**.
5.	**ENTER** to access **MANAGE XX**.
☞	The screen is similar to **MANAGE Coordinate Systems**. Refer to "6 Manage... - Getting Started" for information on the softkeys.
☞	In **MANAGE Transformations** all Classic 3D transformations stored in the database DB-X are listed.

Next step

IF	THEN
a transformation/ellipsoid/projection is to be selected	highlight the desired transformation/ellipsoid/projection. **CONT (F1)** closes the screen and returns to the screen from where **MANAGE XX** was accessed.
a transformation/ellipsoid/projection is to be created or edited	highlight the transformation/ellipsoid/projection and **NEW (F2)**/**EDIT (F3)**. Refer to "11.3.2 Creating/Editing a Transformation/Ellipsoid/Projection".

11.3.2 Creating/Editing a Transformation/Ellipsoid/Projection

Creating/editing an ellipsoid/projection is very similar to creating/editing a transformation which is explained below. The main difference is that **MANAGE XX Ellipsoid** and **MANAGE XX Projection** do not use pages and all the information is input on one screen.

Classic 3D transformations can be created.

Access step-by-step

Step	Description
1.	Refer to "11.3.1 Accessing Transformation/Ellipsoid/Projection Management" to access **MANAGE Transformations**.
2.	In **MANAGE Transformations** highlight a transformation. When creating a new transformation/ellipsoid/projection, a copy of this transformation/ellipsoid/projection is taken for further configurations.
3.	**NEW (F2)**/**EDIT (F3)** to access **MANAGE New Transformation/MANAGE Edit Transformation**.

Editing a transformation is similar to creating a new transformation. For simplicity, the screens are called **MANAGE XX Transformation** and differences are clearly outlined.

MANAGE XX Transformation, General page

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the new transformation. The name may be up to 16 characters long and may include spaces.
<Type:>	Output	No other transformations than Classic 3D can be created.

Next step
PAGE (F6) changes to the **Parameters** page.

MANAGE XX Transformation, Parameters page

Enter the known values of the transformation parameters.

Next step
PAGE (F6) changes to the **More** page.

MANAGE XX Transformation, More page

Description of fields

Field	Option	Description
<Height Mode:>	Choicelist or Output	The type of heights to be computed. When editing a transformation, the option cannot be changed.

Field	Option	Description
<Transf Model:>	Choicelist	The transformation model to be used. For **<Transf Model: Molodensky-Bad>**, additional input fields are available.

Next step
STORE (F1) stores the transformation and returns to **MANAGE Transformations**.

11.4 Geoid/CSCS Models

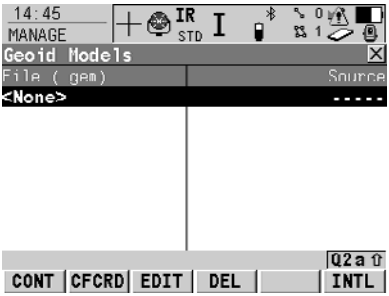
The creation of CSCS models on the instrument and the functionality of all screens and fields is similar to those of geoid models. For simplicity, geoid models are used as an example in this chapter.

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Coordinate Systems**.
2.	In **MANAGE Coordinate Systems** highlight a coordinate system to be edited.
3.	**EDIT (F3)** to access **MANAGE Edit Coordinate System**.
4.	In **MANAGE Edit Coordinate System** highlight **<Geoid Model:>**.
5.	**ENTER** to access **MANAGE Geoid Models**.

MANAGE Geoid Models

All geoid models stored in the database DB-X are listed. Any unavailable information is shown as **-----**, for example, if the geoid field file which was associated to the geoid model is not available on the CompactFlash card / internal memory.



CONT (F1)
To select the highlighted geoid model and to return to the previous screen.

CFCRD (F2)
To create a new geoid model. For each geoid field file on the CompactFlash card, one geoid model is automatically created.

EDIT (F3)
To view the highlighted geoid model. None of the fields can be edited.

DEL (F4)
To delete the highlighted geoid model. The geoid field file which was associated with this geoid model is then also deleted.

INTL (F6)
To create a new geoid model. For each geoid field file in the internal memory, one geoid model is automatically created.

12 Manage...\Configuration Sets

12.1 Overview

Description	The instrument has numerous user configurable parameters and functions. This allows a variety of preferences to be addressed. The configuration of the parameters and functions for an individual measuring technique are combined in a configuration set.
Default configuration sets	Default configuration sets exist on the instrument. They use standard settings for the majority of application programs. Default configuration sets can be edited and deleted. It is always possible to restore the default configuration sets.
User defined configuration sets	New configuration sets can be created. The configuration set wizard assists in editing configuration sets.

12.2 Creating a New Configuration Set

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Configuration Sets**.
2.	In **MANAGE Configuration Sets** highlight a configuration set. A copy of this configuration set is taken for further configurations.
3.	**NEW (F2)** to access **MANAGE New Configuration Set**.

MANAGE New Configuration Set

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the new configuration set.
<Description:>	User input	A detailed description of the configuration set, since the name of a configuration set is usually an abbreviation. Input optional.
<Creator:>	User input	The person's name who creates the new configuration set. Input optional.

Next step

STORE (F1) accesses the next subsequent screen in the configuration wizard. Refer to the chapters "Config...\XX" for information on the screens.

12.3 Editing a Configuration Set

Access step-by-step using configuration set wizard

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Configuration Sets**.
2.	In **MANAGE Configuration Sets** highlight a configuration set to be edited.
3.	**EDIT (F3)** to access **CONFIGURE Wizard Mode**. This starts the sequential configuration set wizard.
4.	Refer to "Config...\XX" for information on the screens.

Access without using configuration set wizard

The currently active configuration set can be edited. Choose one of the following options and access the required screens to edit the configuration set.

Select **Main Menu: Config...**.

OR

From inside an application program press **USER** and then **CONF (F2)**.

OR

In **CONFIGURE Wizard Mode**, press **LIST (F6)**. Refer to "12.2 Creating a New Configuration Set".

13 Manage...\Reflectors

13.1 Overview

Description

- Each reflector type has an additive constant.
- Leica Geosystems reflectors are predefined as default and can be selected.
- Additional reflectors can be defined.

13.2 Creating a New Reflector/Editing a Reflector

Access step-by-step

Step	Description
1.	Refer to "6 Manage... - Getting Started" to access **MANAGE Reflectors**.
2.	In **MANAGE Reflectors** highlight a reflector. When creating a new reflector, the **<Type:>** of the new reflector is taken from the previously highlighted reflector except for RL reflectors.
3.	**NEW (F2)/EDIT (F3)** to access **MANAGE New Reflector/MANAGE Edit Reflector**.

Editing reflectors is similar to creating a new reflector. For simplicity, the screens are called **MANAGE XX Reflector**.

MANAGE XX Reflector

Description of fields

Field	Option	Description
<Name:>	User input or Output	A significant name for the new reflector.
<Type:>	**Prism**, **Tape** or **Undefined**	The type of reflector to be defined.
<Add. Constant:>	User input	The additive constant is always in [mm]. An additive constant of 0.0 mm has been defined for the Leica Geosystems standard reflectors GPR1, GPR111, etc. All entered or selected additive constant values are differences to this 0.0 mm based Leica Geosystems TPS prism system.
<Creator:>	User input	A name of the creator or other comments can be entered.

Next step

STORE (F1) stores the new reflector and returns to **MANAGE Reflectors**.

14 Convert...\Export Data from Job

14.1 Overview

Description

- This screen lists all the exporters loaded.
- Data can be exported
  - to a file on the CompactFlash card.
  - to a file on the internal memory if fitted.
  - via RS232 to an external device.

Export format

The format file must be composed individually as format file using LGO. Refer to the online help of LGO for information on creating format files.

14.2 Exporting ASCII Data

Description

The settings on this screen define the data that is converted and exported and what format is used.
Data is exported from the selected job. Currently active view, filter and sort settings are applied. The points that are exported are those that are visible in **MANAGE Data**: **Job Name**.

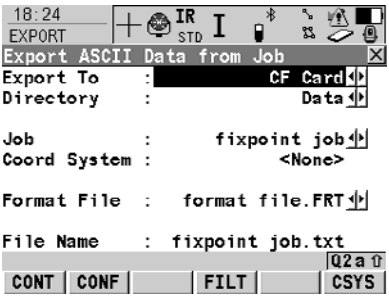
Requirements

At least one format file was created using LGO and has been transferred to the System RAM.

Access

Select **Main Menu: Convert...\Export Data from Job\Export ASCII**.

EXPORT Export ASCII Data from Job



CONT (F1)
To export the data.

CONF (F2)
To define the default extension for the export file and to select the behaviour for the setup measurements.

FILT (F4)
To set the sort and filter settings for export. The setting for **<Sort:>** on the **Points** page defines the order in which points, lines and areas are exported. The setting for **<Filter:>** on each page defines which points, lines or areas are exported.

IFACE (F5)
Available for **<Export To: RS232>**. To choose the port and device to which the data should be exported.

CSYS (F6)
To update the coordinate system in which the coordinates are exported.

Description of fields

Field	Option	Description
<Export To:>	**CF Card**, **Internal Memory** if fitted, or **RS232**	Defines to where the exported file should be written.
<Directory:>	**Data**, **GSI** or **/Root**	Available for **<Export To: CF Card>**. The data can be exported to the \Data, the \GIS or the root directory. Data must be stored to the \GSI directory in order to read it in a TPS1100. For **<Export To: Internal Memory>**, the data is always exported to the \Data directory.

Field	Option	Description
<Job:>	Choicelist	If points from a job on the internal memory are to be exported, open this choicelist. When in this choicelist press **CFCRD (F6)** or **INTL (F6)** to select a job from a different memory device.
<Coord System:>	Output	The coordinate system currently attached to the selected **<Job:>**.
<Format File:>	Choicelist	The format files currently available in the System RAM.
<File Name:>	User input	Available for **<Export To: CF Card>** and **<Export To: Internal Memory>**. The name of the file to which the data should be exported. The name is automatically suggested based on the job name to be exported and an extension.
<Port:>	Output	Available for **<Export To: RS232>**. Displays the port currently configured to be used with RS232.
<Device:>	Output	The device currently configured to be used with **<Port:>**.

14.3 Exporting DXF Data

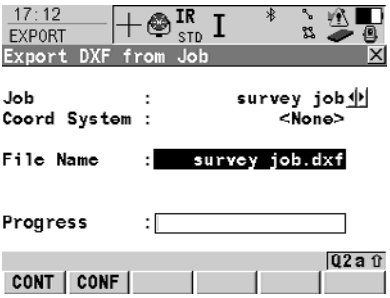
General

Data can be exported to a DXF file in the \DATA directory of the CompactFlash card or the internal memory, if fitted.

Access

Select **Main Menu: Convert...\Export Data from Job\DXF Export**.

DXF Export
Export DXF from Job



CONT (F1)
To export the data.

CONF (F2)
To define elements to be exported, how they will be exported and if labels will be created.

Description of fields

Field	Option	Description
<Job:>	Choicelist	If points from a job on the internal memory are to be exported, open this choicelist. When in this choicelist press **CFCRD (F6)** or **INTL (F6)** to select a job from a different memory device.
<Coord System:>	Output	The coordinate system currently attached to the selected **<Job:>**.
<File Name:>	User input	Available for **<Export To: CF Card>** and **<Export To: Internal Memory>**. The name of the file to which the data should be exported. The name is automatically suggested based on the job name to be exported and extension dxf.
<Progress:>	Output	Progress bar. Displays progress of the export.

14.4 Exporting LandXML Data

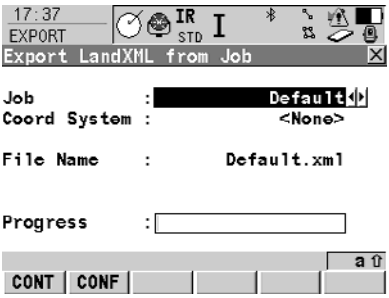
General

Data can be exported to a LandXML file in the \DATA directory of the CompactFlash card or the internal memory, if fitted.

Access

Select **Main Menu: Convert...\Export Data from Job\Export LandXML**.

EXPORT Export LandXML from Job



CONT (F1)
To export the data.

CONF (F2)
To define elements to be exported, how they will be exported, the dimension of the file exported and the LandXML version.

Description of fields

Field	Option	Description
<Job:>	Choicelist	If points from a job on the internal memory are to be exported, open this choicelist. When in this choicelist press **CFCRD (F6)** or **INTL (F6)** to select a job from a different memory device.
<Coord System:>	Output	The coordinate system currently attached to the selected **<Job:>**.
<File Name:>	User input	The name of the file to which the data should be exported. The name is automatically suggested based on the job name to be exported and extension xml.
<Progress:>	Output	Progress bar. Displays progress of the export.

15 Convert...\Import Data to Job

15.1 Overview

Description

- This screen lists all the importers loaded. The data to import must either be stored on the CompactFlash card or in the internal memory, if fitted.
- Data can be imported to a job:
  - on the CompactFlash card.
  - on the internal memory, if fitted.

Import formats

Data can be imported in ASCII, GSI8, GSI16 or DXF format.

Access step-by-step

Step	Description
1.	Select **Main Menu: Convert...\Import Data to Job** to access **IMPORT Import Data to Job Menu**.
2.	**IMPORT Import Data to Job Menu** The Import Data to Job menu lists all the converters for importing data. Highlight the Import Data converter to be started.
3.	**CONT (F1)** to access the screen for the Import Data converter.
☞	The screens for each Import Data converter can be accessed directly by pressing a configured hot key or **USER**.

15.2 Importing ASCII/GSI Data

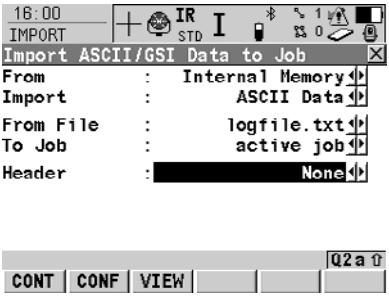
Requirements

- For ASCII files:
  - At least one ASCII file with any file extension is stored in the \DATA directory of the CompactFlash card.
- For GSI files:
  - At least one ASCII file in GSI format with the file extension *.gsi is stored in the \GSI directory of the CompactFlash card.

Access

Refer to "15.1 Overview" to access **Import ASCII/GSI Data to Job**.

IMPORT
Import ASCII/GSI Data to Job



CONT (F1)
To import the data.

CONF (F2)
For **<Import: ASCII Data>**: To select the delimiter, the positions of the particular variables and, if required, the number of lines used to describe each point or if the variables are delimited by one or multi spaces.
For **<Import: GSI Data>**: Coordinates can be switched for "left handed" coordinate systems. All WI 81 data, normally Easting, is then imported as Northing and all WI 82 data, normally Northing, is then imported as Easting.

VIEW (F3)
To display the data in **<From File:>**.

SHIFT HTS (F2)
To define the height type for the imported data and if the Easting should be multiplied by -1. This is required by some coordinate systems.

Description of fields

Field	Option	Description
<From:>	Choicelist	ASCII/GSI Data can be imported to a job, from the CompactFlash Card or Internal memory.
<Import:>	Choicelist	The type of data to be imported.
<From File:>	Choicelist	For **<Import: ASCII Data>** all files in the \DATA directory on the CompactFlash card can be selected. For **<Import: GSI Data>** all files in the \GSI directory on the CompactFlash card can be selected.

Field	Option	Description
<To Job:>	Choicelist	Choosing a job as destination for import makes this job the active job.
<Header:>	**None** and from **1** to **10**	Available for **<Import: ASCII Data>**. This option allows up to ten header lines which may exist in an ASCII file to be skipped. Select the number of header lines.

15.3 Importing DXF Data

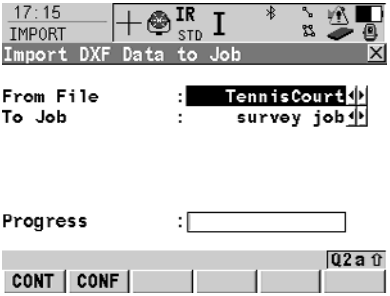
Requirements

- At least one DXF file with the file extension *.dxf has to be stored in the \DATA directory of the CompactFlash card.

Access

Refer to "15.1 Overview" to access **Import DXF Data to Job**.

DXF IMPORT Import DXF Data to Job



CONT (F1)
To import the data.

CONF (F2)
To define an optional prefix for blocks, points and/or lines, to select the file units, to activate the creation of points at vertices of the imported geometric elements, to convert white colored elements to black colored elements, if required and to exclude a height value from conversion.

Description of fields

Field	Option	Description
<From:>	Choicelist	DXF data can be imported to a job, from either the CompactFlash card or internal memory.
<To Job:>	Choicelist	Choosing a job as destination for import makes this job the active job.
<Progress:>	Output	Progress bar of the import procedure.

16 Convert...\Copy Points Between Jobs

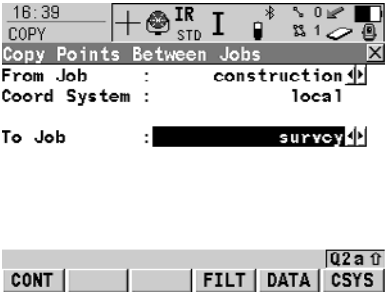
Description

This chapter explains the process of copying points from one job to another.

Access

Select **Main Menu: Convert...\Copy Points Between Jobs**.

COPY
Copy Points Between Jobs



CONT (F1)
To copy a selection of points.

FILT (F4)
To define the point sort and/or point filter settings of points from the job **<From Job:>**.

DATA (F5)
To view, edit and delete points, lines and areas stored with the job. Points, lines and areas are shown on separate pages. Selected sort and filter settings apply.

CSYS (F6)
To select a different coordinate system.

Description of fields

Field	Option	Description
<From Job:>	Choicelist	Describes where the points are to be copied from.
<Coord System:>	Output	The coordinate system which is currently attached to the job **<From Job:>**.
<To Job:>	Choicelist	Describes where the points are to be copied to.

17 Config...\Survey Settings...

17.1 ID Templates

17.1.1 Overview

Description

ID templates are predefined templates for point, line or area numbers. ID templates save having to type in the ID for each object. They are useful when many points are collected quickly.

Access

Select **Main Menu: Config...\Survey Settings...\ID Templates**.

CONFIGURE ID Templates

Description of fields

Field	Option	Description
<Survey Pts:>	Choicelist	Sets the ID templates for measured points.
<Auto Pts:>	Choicelist	Sets the ID templates for auto points. These points are automatically recorded at a specific rate.
<Lines:>	Choicelist	Sets the ID templates for lines.
<Areas:>	Choicelist	Sets the ID templates for areas.

Next step

CONT (F1) closes the screen and returns to the screen from where **CONFIGURE ID Templates** was accessed.

17.1.2 Creating a New ID Template/Editing an ID Template

Access step-by-step

Step	Description
1.	Refer to "17.1.1 Overview" to access **CONFIGURE ID Templates**.
2.	In **CONFIGURE ID Templates** highlight any field.
3.	**ENTER** to access **CONFIGURE ID Template Library**.
4.	Highlight an ID template. A copy of this ID template is taken for further configurations.
5.	**NEW (F2)/EDIT (F3)** to access **CONFIGURE New ID Template/CONFIGURE Edit ID Template**.
☞	**DEL (F4)** deletes the highlighted template.

☞ Editing ID templates is similar to creating a new ID template. For simplicity, the screens are called **MANAGE XX ID Templates** and differences are clearly outlined.

CONFIGURE XX ID Template

Description of fields

Field	Option	Description
<ID:>	User input	The name of the ID template.
<Increment:>	**Numeric only**	The rightmost numeric part is incremented within the point ID.
	Alphanumeric	The rightmost character within the point ID is incremented regardless of whether that character is numeric or alphanumeric.
<Increment By:>	User input	The amount by which the point ID is incremented.
<Cursor Posn:>	**Last Character** or from **1** to **16**	The character position at which the cursor is placed when **ENTER** is pressed in **<Point ID:>** when surveying points.

Next step

CONT (F1) stores the ID template and returns to **CONFIGURE ID Template Library**.

17.2 Display Settings

Description

Display settings define the parameters shown on a page on the **SURVEY** screen.

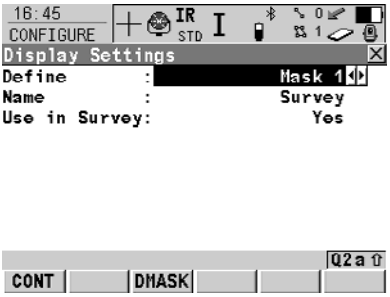
Four display masks are definable.

Mask 1:	Always shown on the **SURVEY** screen.
Mask 2:	Can be shown or hidden on the **SURVEY** screen.
Mask 3:	Can be shown or hidden on the **SURVEY** screen.
Mask 4:	Never shown on the **SURVEY** screen. Reserved for application programs.

Access

Select **Main Menu: Config...\Survey Settings...\Display Settings.**

CONFIGURE Display Settings



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

DMASK (F3)
To configure the selected display mask.

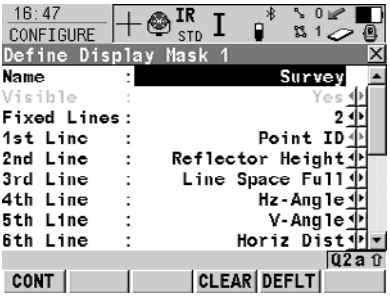
Description of fields

Field	Option	Description
<Define:>	**Mask** **1**, **2**, **3** or **4**	Selected display mask.
<Use in Survey:>	Output	Indicates if the display mask is shown or hidden as a page in **SURVEY**.

Next step

DMASK (F3) accesses **CONFIGURE Define Display Mask n**.

CONFIGURE Define Display Mask n



CONT (F1)
To accept changes and to return to **CONFIGURE Display Settings**.

CLEAR (F4)
To set all fields to **<XX. Line: Line Space Full>**.

DEFLT (F5)
To recall the default settings.

Description of fields

Field	Option	Description
<Name:>	User input	Name of display mask.
<Visible:>	**Yes** or **No**	Shows or hides the display mask as a page in **SURVEY**.
<Fixed Lines:>	From **0** to **5**	Defines how many lines do not scroll in the survey screen when that display mask is used.
<1st Line:>	Output	Fixed to **<1st Line: Point ID>**.
<2nd Line:> to **<16th Line:>**	Choicelist	For each line an option can be selected.

Next step

CONT (F1) returns to **CONFIGURE Display Settings**.

17.3 Coding & Linework Settings

Description

The settings on this screen define the method of coding. For information on configuring and using SmartCodes refer to TPS1200+ Technical Reference Manual.

Access

Select **Main Menu: Config...\Survey Settings...\Coding & Linework Settings**.

CONFIGURE Coding & Linework, Coding page

Description of fields

Field	Option	Description
<Quick Code:>	**Never**, **On** or **Off**	Determines if quick coding is never available, activated or available but deactivated.
<Digits:>	**1**, **2** or **3**	Available unless **<Quick Code: Never>**. Sets the mostly used number of digits for the quick code.
<Rec Free Code:>	**After Point** or **Before Point**	Available unless **<Quick Code: Never>**. Determines if a free code measured with a quick code is stored before or after the point.
<Attributes:>	**Default Values** or **Last Used**	Determines the attribute values displayed under certain circumstances. This is applicable to both the storing and displaying of attribute values.
<Mand Attribs:>	**Always Prompt**	The screen **XX Enter Mandatory Attribute** will always appear when codes, having one or more attributes of attribute type mandatory, are being stored.
	Only If No Value	The screen **XX Enter Mandatory Attribute** will only appear when codes, having one or more attributes of attribute type mandatory, are being stored without an attribute value.
	Code Change Only	The screen **XX Enter Mandatory Attribute** will only appear when a new code with a mandatory attribute was selected.
<Thematc Codes:>	**With Codelist**	Codes stored within the job codelist can be selected to code points, lines and areas.
	Without Codelist	Codes stored within the job codelist cannot be selected to code points, lines and areas. Each code must be entered manually.
<Show Codes:>	**Only Pt Codes** or **All Codes**	Either only point codes or all codes of the job codelist will be available in the choicelist for **<Code:>/<Point Code:>** in a display mask of an application program. Selecting a line/area code opens a new line/area.
<String Attrib:>	Choicelist	Available for **<Show Codes: All Codes>**. When this field is active, surveyed points that have the same code attached are strung to one line.

Next step

PAGE (F6) changes to the **Linework** page.

CONFIGURE Coding & Linework, Linework page

The flags for Linework are defined on this screen.

The flags defined on this screen are linked to the options available for **<Linework:>** in a display mask of an application program. The selection for **<Linework:>** in a display mask determines the flag stored with a point. The availability of **<Linework:>** in a display mask is configured in **CONFIGURE Define Display Mask n**.

Description of fields

Field	Option	Description
<Begin Line:>	User input	Opens a new line when the next point is stored. Any lines which are currently open are closed. The point may or may not be stored with a point code.
<3pt Curve:>	User input	Stores the linework flag for a curve through three points and continues a line/area.
<ReOpen Last Line:>	User input	Opens the last used line again.
<End Line:>	User input	Closes all open lines.
<Cont Line/Area:>	User input	Indicates a line/area is open.
<Start Spline:>	User input	Stores the linework flag for beginning a spline and continues any open line/area.
<End Spline:>	User input	Stores the linework flag to stop a spline.
<Cont Spline:>	User input	Indicates a line/area is open with spline line type.
<Begin Area:>	User input	Opens a new area when the next point is stored. Any areas which are currently open are closed. The point may or may not be stored with a point code.
<ReOpen Last Area:>	User input	Opens the last used area again.
<Close Area:>	User input	Closes all open areas.

Next step

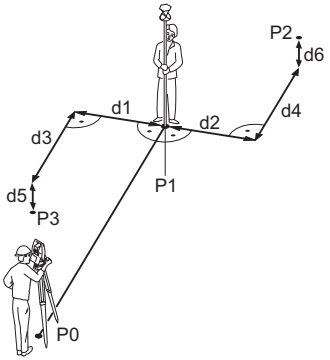
CONT (F1) returns to the screen from where **CONFIGURE Coding & Linework** was accessed.

17.4 Offsets

Description

Offsets can be configured and entered. The offset values are applied to measured points. The Offset function allows offset points to be determined, for instance when the reflector cannot be set up directly on a point. Transverse, longitudinal and/or elevation offsets can be defined from the reflector position to the offset point. All of the displayed and recorded measurement data is in relation to the offset point.

Diagram



TPS12_041

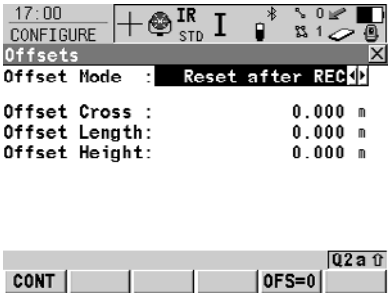
P0	Station
P1	Current position
P2	Offset point
P3	Offset point
d1	Offset cross -
d2	Offset cross +
d3	Offset length -
d4	Offset length +
d5	Offset height -
d6	Offset height +

If configured in a display mask, the offset values appear also in the display mask in Survey.

Access

Select **Main Menu: Config...\Survey Settings...\Offsets**.

CONFIGURE Offsets



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

OFS=0 (F5)
To set all offsets to 0.000.

Description of fields

Field	Option	Description
<Offset Mode:>	**Reset after REC**	The offset values are reset to 0.000 after a point is measured with **REC (F3)** or **ALL (F1)**.
	Permanent	The offset values are applied to every measured point until reset or changed.

Field	Option	Description
<Offset Cross:>	User input	Sets cross offset of target point, perpendicular to the line of sight.
<Offset Length:>	User input	Sets length offset of target point, in the direction of the line of sight.
<Offset Height:>	User input	Sets height offset of target point.

Next step

CONT (F1) returns to the screen from where **CONFIGURE Offsets** was accessed.

18 Config...\Instrument Settings...

18.1 EDM & ATR Settings

Description

The settings on this screen define the active EDM **E**lectronic **D**istance **M**easurement and ATR **A**utomatic **T**arget **R**ecognition settings.

☞ Descriptions apply in general to TPS1200+ instruments. Available options depend on the purchased model, for example with or without ATR.

Access

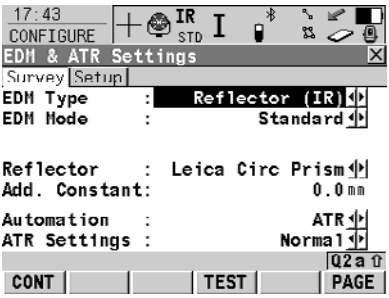
Select **Main Menu: Config...\Instrument Settings...\EDM & ATR Settings**.

CONFIGURE
EDM & ATR Settings
Survey page
Setup page

Description

- This screen has two pages - the Survey page and the Setup page.
- The Survey page and Setup page contain identical fields.
- The settings made in the Survey page are used by all applications and all measurements taken outside of the Setup application program.
- The settings made in the Setup page are only used inside the Setup application program.
- Any changes made to the EDM & ATR Settings (e.g. via Icons, Quick Set, Hotkeys) while the Setup application program is active, only affect the Setup EDM & ATR settings.
- Any changes made to the EDM & ATR Settings (e.g. via Icons, Quick Set, Hotkeys) while the Setup application program is not active, only affect the Survey EDM & ATR settings.
- When entering the Setup application program, the Setup EDM & ATR Settings are active.
- When leaving the Setup application program, the Survey EDM & ATR Settings are active.
- Both Survey and Setup EDM & ATR Settings are part of the configuration sets.

Diagram



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

TEST (F4)
To access the **CONFIGURE EDM Test Signal/Frequency** screen.

Description of fields

Field	Option	Description
<EDM Type:>	**Reflector (IR)**	• All fields are set to the last used options. • The IR EDM exists for all instrument types and allows to measure the distance to a prism or a tape. IR is the EDM that can be used with ATR and LOCK. For **<Automation: ATR>** or **<Automation: LOCK> <EDM Type: Reflector (IR)>** is automatically set. Whenever **<EDM Type: Reflector (IR)>** is selected, the last setting for **<Automation:>** which was used with reflector is set. • When activated, **IR** is displayed.
	Reflctrless (RL)	• **<Automation: None>** and **<Reflector: Reflectorless>** are selected. The other fields are set to the last used options. • When activated, **RL** is displayed.
	Long Range (LO)	• **<Automation: None>** is selected. Last used options are reset for the other fields. • When activated, **LO** is displayed.
<EDM Mode:>	**Standard**	• Available for all **<EDM Type:>** options. Standard single distance measurement. • When activated, **STD** is displayed.
	Fast	• Available for **<EDM Type: Reflector (IR)>**. Fast single distance measurement. • When activated, **FAST** is displayed.
	Tracking	• Available unless **<EDM Type: Long Range (LO)>**. Continuous distance measurement. The measured distances can be stored anytime with **REC (F3)**. • When activated, **TRK** is displayed.
	SynchroTrack	• Available only for **<EDM Type: Reflector (IR)>**.

Field	Option	Description
		• This is the measurement mode for the interpolation of angle measurements in IR LOCK Tracking mode. In difference to normal IR LOCK Tracking mode, where angle measurements are only assigned to certain distance measurements, SynchroTrack will perform a linear interpolation between the previous and following angle measurement, based upon the timestamp of the EDM measurement. • When activated, **SYNC** is displayed.
	Average	• Available for all **<EDM Type:>** options. Repeats measurements in standard measuring mode. The average distance of **<AVG Max #Dist:>** and the standard deviation for the averaged distance are calculated. • When activated, **AVG** is displayed. • •
<AVG Max #Dist:>	User input	Available if **<EDM Mode: Average>**. Input field for the maximum number of distances to be averaged from 2 to 999 distances.
<Reflector:>	Choicelist	Reflector names as configured in **Main Menu: Manage...\Reflectors**.
<Add. Constant:>	Output	The additive constant stored with the chosen reflector.
<Automation:>	**None**	Measurements are done without ATR.
	ATR	Positioning to static prisms.
	LOCK	Unavailable for SmartStation. The instrument locks onto and follows the moving prism.
<ATR Settings:>	Choicelist	• ATR Settings.
	Normal	• Normal Mode is turned on.
	Low Vis On	• Low Visability Mode is turned on. To increase the instrument measuring ability during suboptimal weather conditions. Available only when ATR or LOCK mode is activated.

Field	Option	Description
		• This mode is automatically deactivated when the instrument is turned off. • This mode has a considerable influence on the range (restriction to 100-150 m).
	Low Vis Always On	• Low Visability Mode is permanently turned on.
	S-Range On	• Short Range Mode is turned on. • This mode is designed for survey work at close range from the instrument (up to 60-80 m). Under these conditions the instrument LOCK Mode is significantly stabilised. • This mode is automatically deactivated when the instrument is turned off.
	S-Range Always On	• Short Range Mode is permanently turned on.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

18.2 Search Windows

Description

The settings on this screen define the size of search windows for prisms to be searched in. The prisms can be searched with ATR in the ATR window or with PowerSearch in the PS window.

Access

Select **Main Menu: Config...\Instrument Settings...\Search Windows**.

CONFIGURE Search Windows, PS Window page

CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

NEW (F2)
To define new PowerSearch window.

CENTR (F4)
To centre the PowerSearch window to the current position of the telescope.

SHOW (F5)
To position the telescope to corners of PowerSearch window.

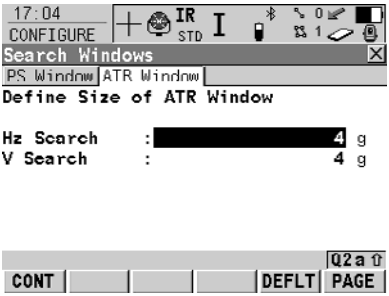
Description of fields

Field	Option	Description
<PS Window:>	**On**	PowerSearch searches in the defined window.
	Off	PowerSearch searches from 0° to 360° within ±20 gon from horizon.
<Hz left:> **<Hz right:>** **<V upper:>** **<V lower:>**	Output	The left, right, upper and lower boundaries of the PowerSearch window.
<Dist min:>	**Min** and from **25 m** to **175 m**	Minimum distance of the search range for the PS window to be defined.
<Dist max:>	From **25 m** to **175 m** and **Max**	Maximum distance of the search range for the PS window to be defined.

Next step

PAGE (F6) changes to the **ATR Window** page.

CONFIGURE Search Windows, ATR Window page



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

DEFLT (F5)
To recall the default ATR window settings.

PAGE (F6)
To change to other page on screen.

Description of fields

Field	Option	Description
<Hz Search:>	User input	Horizontal extent of window.
<V Search:>	User input	Vertical extent of window.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

18.3 Automatic Prism Search

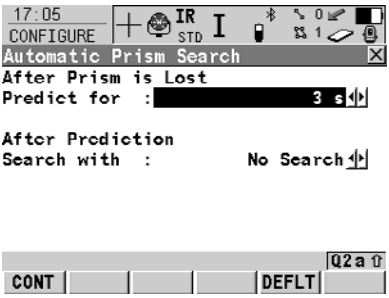
Description

The settings on this screen define the behaviour of automatic prism search after the target is lost in lock mode.

Access

Select **Main Menu: Config...\Instrument Settings...\Automatic Prism Search**.

CONFIGURE Automatic Prism Search



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

DEFLT (F5)
To recall the default settings.

Description of fields

Field	Option	Description
<Predict for:>	From **1 s** to **5 s**	If the target is lost when **<Automation: LOCK>** the path of the reflector is predicted for the selected amount of seconds.
<Search with:>	**No Search**, **ATR**, **PowerSearch** or **Last Point**	Perform no search after prediction, search with ATR in a dynamic ATR window, search with PowerSearch or, if the target is lost when **<Automation: LOCK>**, then turn back to the last stored point. For **<PS Window: On>** search in PS window and for **<PS Window: Off>** search in dynamic PS window.

Next step

CONT (F1) closes the screen and returns to **TPS1200+ Main Menu**.

18.4 TPS Corrections

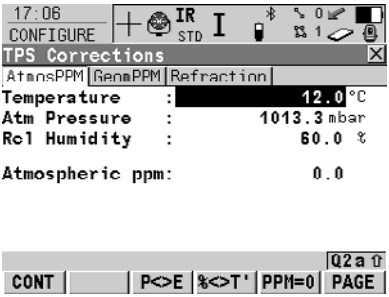
Description

The settings on this screen define the atmospheric ppm, the geometric ppm and the refraction. The geometric ppm can also be determined by a resection calculation. For standard application programs the distance is corrected on account of atmospheric influences. The geometrical correction and the projection distortions are set to 0.00. Heights are reduced with the standard refraction coefficient.

Access

Select **Main Menu: Config...\Instrument Settings...\TPS Corrections**.

CONFIGURE TPS Corrections, AtmosPPM page



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

P<>E (F3)
To change **<Atm Pressure:>** to **<Elev above MSL:>** and back.

%<>T ' (F4)
To change **<Rel Humidity:>** to **<Temp Wet-bulb:>** and back.

PPM=0 (F5)
To set **<Atmospheric ppm: 0.0>**.

Description of fields

Field	Option	Description
<Temperature:>	User input	Sets the temperature.
<Atm Pressure:> or **<Elev above MSL:>**	User input	Sets the atmospheric pressure or the elevation above mean sea level dependent on selection.
<Rel Humidity:> or **<Temp Wet-bulb:>**	User input	Sets the relative air humidity or the wet bulb temperature dependent on selection.
<Atmospheric ppm:>	User input or Output	The atmospheric ppm is either set or calculated from the above values.

Next step

PAGE (F6) changes to the **GeomPPM** page.

CONFIGURE TPS Corrections, GeomPPM page

- The geometric distance correction (geometric ppm) is derived from the map projection distortion (map projection ppm), the height above reference datum correction (height ppm) and an individual correction (individual ppm).
- The calculation of the map projection ppm follows the formula for the Transversal Mercator Projection. The individual factors are: the scale factor of the line of projection central meridian, Gauss-Krüger = 1.0, UTM = 0.9996, etc. and the offset from the line of projection.
- The calculation of the height ppm is derived from the height of the instrument station above the reference datum. Normally this is the height above mean sea level MSL.

Description of fields

Field	Option	Description
<Calc Scale:>	Choicelist	To manually or automatically calculate the geometric ppm value.
	Manually	The geometric ppm value is manually calculated.
	Automatically	The geometric ppm value is automatically calculated.
<Scale at C.M.:>	User input	Sets scale at central meridian. Available when **<Calc Scale: Manually>**.
<Offset to C.M.:>	User input	Sets offset to central meridian. Available when **<Calc Scale: Manually>**.
<Map Proj ppm:>	Output	The ppm for the map projection.
<Ht above Ref:>	User input	Sets the height above reference. Available when **<Calc Scale: Manually>**.
<ppm above Ref:>	Output	The ppm above reference. Available when **<Calc Scale: Manually>**.
<Height ppm:>	Output	The height ppm value calculated from the height coordinates of the current TPS station stored in the System RAM. If this value cannot be calculated, then **-----** is displayed and is also ignored in the calculation of the geometric ppm value. Available for **Calc Scale: Automatically**
<Individual ppm:>	User input	Sets the individual ppm. Available when **<Calc Scale: Manually>**.
<Geometric ppm:>	Output	The geometric ppm is the sum of: **<Map Proj ppm:>**, **<ppm above Ref:>** and **<Individual ppm:>**.

Next step

PAGE (F6) changes to the **Refraction** page.

CONFIGURE TPS Corrections, Refraction page

The refraction correction is taken into account during the calculation of the height difference.

Description of fields

Field	Option	Description
<Correction:>	**On** or **Off**	Refraction correction is applied to measurements.
<Ref coeff (k):>	User input	Available if **<Correction: On>**. Refraction coefficient to be used for calculation.

Next step

CONT (F1) returns to the screen from where **CONFIGURE TPS Corrections** was accessed.

18.5 Compensator

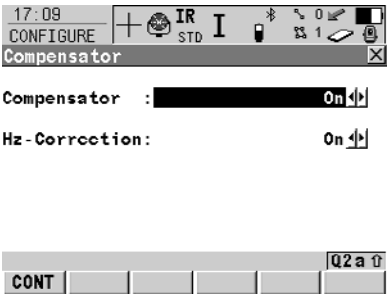
Description

The compensator and the Hz correction can be deactivated if raw data is to be displayed and recorded.

Access

Select **Main Menu: Config...\Instrument Settings...\Compensator.**

CONFIGURE Compensator



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

Next step
CONT (F1) returns to **TPS1200+ Main Menu**.

18.6 Instrument ID

Description

The settings on this screen define the instrument identification number. This number is used for the generation of the file names. Using format files, the instrument ID can be output together with data from the instrument. By doing so, it can be identified which instrument was used for certain measurements.

Access

Select **Main Menu: Config...\Instrument Settings...\Instrument ID**.

CONFIGURE Instrument ID

Description of fields

Field	Option	Description
<Instrument ID:>	User input	Sets a four digit number as instrument identification number. By default the last four numbers of the serial number are used.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

18.7 Telescope Accessories

Description

The settings on this screen offer the possibility to limit the motorization to a certain part of the horizontal and/or vertical circle as used telescope and lens accessories may obstruct a full rotation of the telescope. General positioning functions are then restricted to these boundaries.

Access

Select **Main Menu: Config...\Instrument Settings...\Telescope Accessories**.

CONFIGURE Telescope Accessories, Hz Limit page

CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

NEW (F2)
To define new horizontal limits for instrument rotation.

SHOW (F5)
To position the instrument to the left and right limit of instrument turning.

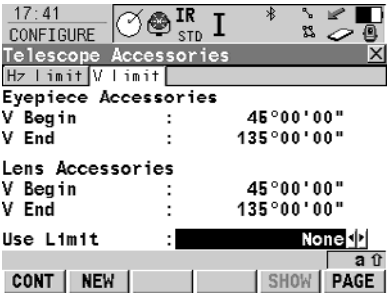
Description of fields

Field	Option	Description
<Hz Begin:> **<Hz End:>**	Output/User input	The left and right boundaries of the window within the instrument is allowed to turn.
<Use Limit:>	**Yes**	Instrument turning is restricted to the defined window.
	No	Instrument rotates without any limitation, from 0 to 400 gon.

Next step

PAGE (F6) returns to the **V Limit** page.

CONFIGURE Telescope Accessories, V Limit page



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

NEW (F2)
To define new vertical limits for telescope rotation.

SHOW (F5)
To position the telescope to its rotation limits.

Description of fields

Field	Option	Description
<V Begin:> **<V End:>**	Output/User input	Vertical extent of the window in which the instrument is allowed to turn the telescope. The value of the current limit refers to the vertical reading of the present line of sight direction.
<Use Limit:>	**None**	Telescope turns without any limitation,from 0 to 400 gon.
	Eyepiece	The movement of the telescope is limited by the stored Eyepiece Accessories Limits.
	Lens	The movement of the telescope is limited by the stored Lens Accessories Limits.
	Eyepce & Lens	The movement of the telescope is limited by the combination of both areas with the least vertical extend.

Next step
CONT (F1) returns to **TPS1200+ Main Menu**.

19 Config...\General Settings...

19.1 Wizard Mode

Description

The settings on this screen define the behaviour of the configuration set wizard.

Access

Select **Main Menu: Config...\General Settings...\Wizard Mode**.

CONFIGURE
Wizard Mode

CONT (F1)
To accept changes and to return to **TPS1200+ Main Menu**.

LIST (F6)
Lists all screens within a configuration set. Allows to access these individual screens and change settings.

Description of fields

Field	Option	Description
<Wizard Mode:>	**View All Screens**	All configuration screens are shown in the configuration set wizard. Application program configuration screens are not included. They can be configured within each application program.
	Reduced	A reduced set of screens are shown in the configuration set wizard.

Next step
CONT (F1) returns to **TPS1200+ Main Menu**.

19.2 Hot Keys & User Menu

Description

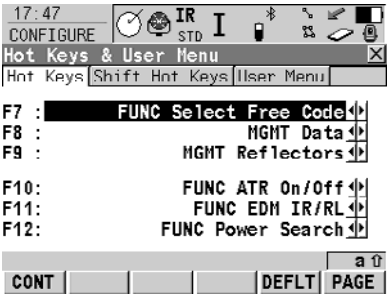
- The settings on this screen assign a particular function, screen or application program to each of the first and second level of hot keys and to the **USER** key.
- Refer to "2 Configurable Keys" for further details.

Access

Select **Main Menu: Config...\General Settings...\Hot Keys & User Menu**.

Configuring Hot Keys

For TPS1200+:



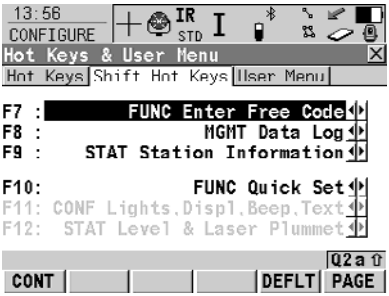
CONT (F1)
To accept changes and to return to **TPS1200+ Main Menu**.

DEFLT (F5)
To recall the default settings.

Description of fields

Field	Option	Description
<F7:> to **<F12:>**	Choicelist	All functions, screens or application programs which can be assigned to the particular key.

Configuring Shift Hot Keys



CONT (F1)
To accept changes and to return to **TPS1200+ Main Menu**.

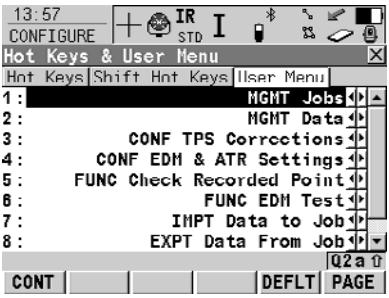
DEFLT (F5)
To recall the default settings.

Description of fields

Field	Option	Description
<F7:> to **<F10:>**	Choicelist	All functions, screens or application programs which can be assigned to the particular key.

Field	Option	Description
<F11:>	Output	The lights, display, beeps and text settings can be edited.
<F12:>	Output	The electronic level is displayed.

Configuring User Menu



CONT (F1)
To accept changes and to return to **TPS1200+ Main Menu**.

DEFLT (F5)
To recall the default settings.

Description of fields

Field	Option	Description
<1:> to **<9:>**	Choicelist	All functions, screens or application programs which can be assigned to the individual lines in the user defined menu.

19.3 Units & Formats

Description

The settings on this screen define:

- the units for all types of measurement data displayed.
- information related to some types of measurement data.
- the order in which coordinates are displayed.

Access

Select **Main Menu: Config...\General Settings...\Units & Formats**.

CONFIGURE Units & Formats, Units page

Description of fields

Field	Option	Description
<Distance Unit:>	**Metre (m)**, **Int Ft (fi)**, **Int Ft/Inch (fi)**, **US Ft (ft)** or **US Ft/Inch (ft)**	The units shown for all distance and coordinate related fields.
<Distance Dec:>	From **0 Decimal** to **4 Decimals**	The number of decimal places shown for all distance and coordinate related fields. This is for data display and does not apply to data export or storage.
<Angle Unit:>	**400 gon**, **360 ° ' "**, **360° dec** or **6400 mil**	The units shown for all angular and coordinate related fields. More angle settings can be defined on the **Angle** page.
<Angle Dec:>		The number of decimal places shown for all angular and coordinate related fields. This is for data display and does not apply to data export or storage.
	From **2 Decimals** to **4 Decimals**	Available for **<Angle Unit: 400 gon>** or **<Angle Unit: 360° dec>**.
	From **1 Decimal** to **3 Decimals**	Available for **<Angle Unit: 6400 mil>**.
	4 Decimals	Available for **<Angle Unit: 6400 mil>**.
	5 Decimals	Available for **<Angle Unit: 400 gon>** or **<Angle Unit: 360° dec>**.
	0.1'', 1'', 5'', 10'', 60''	Available for **<Angle Unit: 360 ° ' ''>**.
<Grade Unit:>		The input and output format for grades.
	h:v	Horizontal by vertical distance.
	v:h	Vertical by horizontal distance.
	% (v/h * 100)	Percentage of vertical by horizontal distance.
	Elev Angle	Elevation angle.

Field	Option	Description
<Area Unit:>	**m^2**, **Int Acres (Ai)**, **US Acres (A)**, **Hectares (ha)**, **fi^2** or **ft^2**	The units shown for all area related fields.
<Volume Units:>	**m^3**, **fi^3**, **ft^3** or **yd^3**	The units shown for volume related fields.
<Temp Unit:>	**Celsius (°C)** or **Fahrenheit (°F)**	The units shown for all temperature related fields.
<Press Unit:>	**mbar**, **mmHg**, **Inch Hg (inHg)**, **hPa** or **psi**	The units shown for all pressure related fields. psi = pounds per square inch.

Next step
PAGE (F6) changes to the **Angle** page.

CONFIGURE Units & Formats, Angle page

Description of fields

Field	Option	Description
<Direc Ref:>	**North Azimuth**, **South Azimuth**, **North Anticlock**, or **Bearing**	Sets the reference direction as well as the direction from where and how azimuths are computed.
<V-Display:>	**Zenith Angle**, **Elev Angle** or **Elev Angle %**	Sets the vertical angle.
<V-Angle:>	**Hold after DIST** or **Running**	The vertical angle is fixed or continuously updated with the telescope movement after a distance measurement with **DIST (F2)**.
<Face I:>	**Hz-Drive Right** or **Hz-Drive Left**	Horizontal drive on the right or left side.

Next step
PAGE (F6) changes to the **Time** page.

CONFIGURE Units & Formats, Time page

Description of fields

Field	Option	Description
<Time Format:>	**24 hour** or **12 hour (am/pm)**	How the time is shown in all time related fields.
<Time:>	User input	Time, displayed with format hh:mm:ss

Field	Option	Description
<Date Format:>	**Day.Month.Year**, **Month/Day/Year** or **Year/Month/Day**	How the date is shown in all date related fields.
<Date:>	User input	Date, displayed with format dd:mm:yy

Next step
PAGE (F6) changes to the **Format** page.

CONFIGURE Units & Formats, Format page

Description of fields

Field	Option	Description
<Grid Format:>	**East,North** or **North,East**	The order in which grid coordinates are shown in all screens. The order in display masks depends on the user settings.
<Geodetic Format:>	**Lat,Long** or **Long,Lat**	The order in which geodetic coordinates are shown in all screens. The order in display masks depends on the user settings.

Next step
PAGE (F6) changes to the first page on this screen.

19.4 Language

Description

The setting on this screen defines the language used on the instrument. Three languages can be stored on the instrument at one time - English and two others. English cannot be deleted.

Access

Select **Main Menu: Config...\General Settings...\Language**.

CONFIGURE Languages on Instrument

Description of columns

Column	Description
Language	The languages available on the instrument. The selected language is used for the system software. If a language is not available for the system software, the English language is used instead. Application programs run in the language they were loaded.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

19.5 Lights, Display, Beeps, Text

Description

The settings on this screen allow the screen appearance to be configured, turn the notification beeps on and off and define the behaviour of the keys.

Access

Select **Main Menu: Config...\General Settings..\Lights**, **Display**, **Beeps**, **Text**

OR

Press **SHIFT F11**.

CONFIGURE Lights, Display, Beeps, Text, Lights page

Description of fields

Field	Option	Description
<Redlaser:>	**On** or **Off**	To turn the redlaser of RL EDM on and off.
<EGL:>	**On** or **Off**	To turn the Emitting Guide Light (EGL) on and off. This field is only available if EGL is fitted
<Laser Guide:>	**On** or **Off**	To turn the Laser Guide (GUS74) on and off. This field is only available if GUS74 is fitted
<Intensity:>	From **0 %** to **100 %**	To adjust the EGL/Laser Guide intensity using the left and right arrow keys.
<Reticule:>	**On** or **Off**	To turn the reticule illumination on and off.
<Intensity:>	From **0 %** to **100 %**	To adjust the reticule illumination intensity using the left and right arrow keys.

Next step

PAGE (F6) changes to the **Display** page.

CONFIGURE Lights, Display, Beeps, Text, Display page

This page contains the screen display settings for the TPS1200+ instrument.

Description of fields

Field	Option	Description
<Touch Screen:>	**On** or **Off**	Turns touch screen on and off.
<Screen Beep:>	**Off**, **Soft** or **Loud**	Controls the beep upon touching the touch screen.
<Screen Illum:>	**Always On**, **On for 1 min**, **On for 2 min** or **On for 5 min**	Controls the screen illumination to be on, or on for the specified time after the last key was pressed, or touch screen event.
<Key Illum:>	**Off**, **Same as Screen** or **Always On**	Controls the keyboard illumination.
<Brightness:>	From **1** to **5**	To adjust the screen brightness.

Next step

PAGE (F6) changes to the **Beeps** page.

CONFIGURE Lights, Display, Beeps, Text, Beeps page

Description of fields

Field	Option	Description
<Warning Beeps:>	**Off**, **Soft** or **Loud**	Controls the beep for acoustic warning signals for the instrument.
<WarnBeeps RCS:>	**Off**, **Soft** or **Loud**	Controls the beep for acoustic warning signals for the RX1200 controller.
<Key Beeps:>	**Off**, **Soft** or **Loud**	Controls the beep upon key presses for the TPS1200+instrument.
<Key Beeps RCS:>	**Off**, **Soft** or **Loud**	Controls the beep upon key presses for the RX1200 controller.
<Hz-Sectr Beep:>	**On** or **Off**	Turns the Hz-sector beep on and off. The instrument beeps when within 5 gon/4°30' of the defined sector, there is a long and consistent beep within 0.5 gon/27' and no beep within 0.005 gon/16''.
<Sector Angle:>	User input	Input field for sector angle for which a beep should sound.

Next step

PAGE (F6) changes to the **Text** page.

CONFIGURE Lights, Display, Beeps, Text, Text page

Description of fields

Field	Option	Description
<Key Rpt Delay:>	User input	Key repeat delay is the time between the initial key press and when the key starts repeating. For example in numeric mode press and hold 1. Behaviour on screen: 1 - delay - 11111111111.
<Alpha Mode:>	**Function Keys** or **Numeric Keys**	Alphanumeric input can either be through function or numeric keys.
<Deflt αNum:>	Choicelist	Available if **<Alpha Mode: Function Keys>**. Sets the set of extra characters available through **αNUM** or on **F1**-**F6** whenever an entry is made. The choices available depend on the character sets loaded on the instrument and the language configured to be used on the instrument.

Next step

PAGE (F6) changes to one of the other pages.

19.6 Start Up & Power Down

Description

- The settings on this screen:
  - define the behaviour of the instrument for a general start up.
  - define the behaviour of the instrument when starting up after a power loss.
  - define a PIN code which needs to be typed in on starting up the instrument. A PIN is a **P**ersonal **I**dentification **N**umber.

Access

Select **Main Menu: Config...\General Settings...\Start Up & Power Down**.

CONFIGURE Start Up & Power Down
Start Up & Power Down page

Description of fields

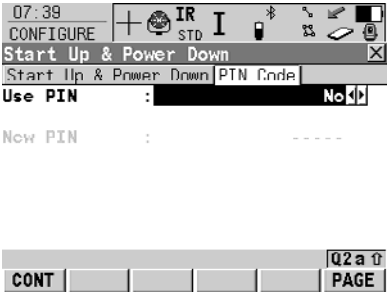
Field	Option	Description
General settings		
<Start Screen:>	Choicelist	Determines the first screen which is shown after turning on the instrument.
<Power Down:>	**With Confirmation** or **Directly**	Sets the behaviour of the instrument shut down.
Auto Power Down Behaviour settings		
<Mode:>	**Turn Off** or **Remain On**	The instrument turns off or does not power down if no events have occurred.
<After Time:>	User input	Available unless **<Mode: Remain On>** is selected. Minutes after which the instrument should turn off.
SmartAntenna settings		
<Switch Off:>	Choicelist	This option determines when SmartAntenna is turned off. The selected time is activated whenever SmartStation leaves GPS mode. This option is directly linked to **<Switch Off:>** in **CONFIGURE Logging of Raw Obs**. Refer to "23.6 Logging of Raw Obs" for details.
Power settings for Device on Port 2		
<Switch On:>	**If Device Found** **If ATX Found**	Devices attached to port 2 are automatically powered up. SmartAntenna attached to port 2 is automatically powered up.

Next step
CONT (F1) changes to the **PIN Code** page.

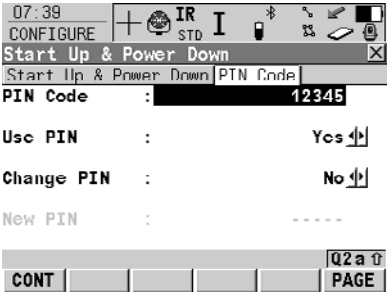
CONFIGURE
Start Up & Power Down
PIN Code page

Whenever this screen is accessed the appearance of the screen varies, depending on the setting for **<Use PIN:>**

<Use PIN: No>



<Use PIN: Yes>



Description of fields

Field	Option	Description
Use PIN	**Yes** or **No**	Activates the PIN code protection. This setting is not part of the configuration set.
New PIN	User input	The PIN code must be a number with four to six digits.
PIN Code	User input	The PIN code as previously defined on this page. The correct PIN code must be typed in within five attempts or the PUK code is required.
Change PIN	**Yes** or **No**	Activates **<New PIN:>** to type in a new PIN code.

Next step

PAGE (F6) changes to the first page on this screen.

20 Interfaces, Ports, Devices

20.1 Interfaces

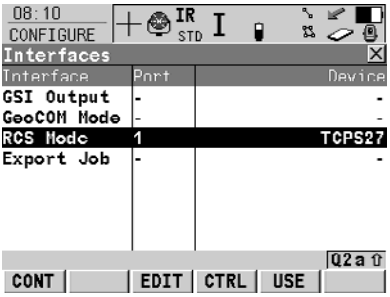
20.1.1 Overview of Interfaces

Description

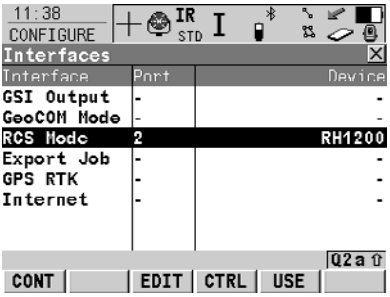
- The instrument has various interfaces configured to to be used with a port and a device. The configuration varies depending on the individual application.
- Additional interfaces are always available when the instrument is fitted with Communication side cover. Communication side cover is used by RadioHandle with RCS and by SmartAntenna Adapter with SmartStation.

Available interfaces

TPS1200+ without Communication side cover



TPS1200+ with Communication side cover

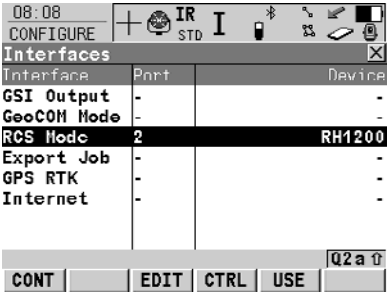


20.1.2 Configuring an Interface

Access

Select **Main Menu: Config...\Interfaces...**.

CONFIGURE Interfaces



CONT (F1)
To return to the screen from where this screen was accessed.

EDIT (F3)
To configure the parameters related to the highlighted interface.

CTRL (F4)
Available for certain devices connected to certain interfaces. To configure additional paramaters.

USE (F5)
To turn the selected interface on/off.

20.2 Ports

Description

- The instrument is always fitted with the port located at the instrument base (port 1). Additional ports are available when Communication side cover is fitted (port 2 and port 3).
- The list of available devices always depends on the selected port.

Available ports

Type

TPS1200+ without Communication side cover	Port	TPS1200+ with Communication side cover
5 pin LEMO-0 for power and/or communication	Port 1	For TPS1200+: 5 pin LEMO-0 for power and/or communication
not applicable	Port 2 (Handle)	Hotshoe connection for RadioHandle with RCS and SmartAntenna Adapter with SmartStation
not applicable	Port 3 (BT)	Bluetooth module for communication with only Bluetooth capable devices.

Location

Port	Description
Port 1	This port is located at the base of the instrument and is always available.
Port 2 (Handle)	This port is located on top of Communication side cover.
Port 3 (BT)	This port is housed within Communication side cover.

20.3 Devices

20.3.1 Overview of Devices

Description

- A device is the hardware which is connected to the chosen port. Devices are used to transmit and receive measurement data in TPS mode and GPS real-time data in GPS mode. Devices are also used by TPS1200+ to communicate with the RX1200 controller.
- Before using any device with TPS1200+ it is necessary to configure it and the interface with which it will be used.
  - Refer to "20.1.2 Configuring an Interface" for information on how to configure interfaces.
  - Refer to "20.3.2 Configuring a Device" for information on how to create, edit, select and delete devices.
  - Refer to "20.3.3 Controlling a Device" for information on how to configure additional device parameters.
- Some devices may be used with different interfaces for different applications. For example, a radio can be used for remote control with TPS1200+ but also to send GeoCOM commands from a computer to TPS1200+.

20.3.2 Configuring a Device

Description

Allows devices to be created, edited, selected and deleted.

Access step-by-step

Step	Description
1.	**Main Menu: Config...\Interfaces...** to access **CONFIGURE Interfaces**.
2.	Highlight the appropriate interface based on the type of device that needs to be configured. For example, highlight **RCS Mode** when a radio is to be configured.
3.	**EDIT (F3)** to access **CONFIGURE XX**.
4.	**DEVCE (F5)** to access **CONFIGURE Devices**.

20.3.3 Controlling a Device

Description

Allows additional device parameters to be configured.

Access step-by-step

Step	Description
1.	**Main Menu: Config...\Interfaces...** to access **CONFIGURE Interfaces**.
2.	Highlight the appropriate interface based on the type of device that needs to be configured. For example, highlight **RCS Mode** when a radio is to be configured.
3.	**CTRL (F4)** to access **CONFIGURE XX**.

20.3.4 Creating a New Device/Editing a Device

Access step-by-step

Step	Description
1.	Refer to "20.3.2 Configuring a Device" to access **CONFIGURE Devices**.
2.	Highlight a device of the same type as the device to be created, from the list.
3.	**NEW (F2)**/**EDIT (F3)** to access **CONFIGURE New Device/CONFIGURE Edit Device**.

Editing a device is similar to creating a new device. For simplicity, the screens are called **CONFIGURE XX Device** and differences are clearly outlined.

CONFIGURE XX Device

Description of fields

Field	Option	Description
<Name:>	User input	Available when creating a new device. The name of the device.
	Output	Available when editing a device. The name of the device.
<Type:>	Output	The type of device
<GRPS/ Internet:>	**Yes** or **No**	Available for digital cellular phones and modems. Defines the device as an Internet capable device and adds it to the list in **CONFIGURE GPRS Internet Devices**.
<Baud Rate:>	From **2400** to **115200**	Frequency of data transfer from instrument to device in bits per second.
<Parity:>	**None, Odd** or **Even**	Error checksum at the end of a block of digital data.
<Terminator:>		To define the terminator.
	CR/LF	The terminator is a carriage return followed by a line feed.
	CR	Not available for RS232 GeoCOM and TCPS27 device. The terminator is a carriage return.
<Data Bits:>	**6**, **7** or **8**	Number of bits in a block of digital data.
<Stop Bits:>	**1** or **2**	Number of bits at the end of a block of digital data.
<Flow Control:>	**None** or **RTS/CTS**	Activates hardware handshake.

Next step

IF the device is a	THEN
radio or device other than digital cellular phone or modem	**STORE (F1)** to close the screen and to return to the screen from where **CONFIGURE XX Device** was accessed.
digital cellular phone or modem	**ATCMD (F4)**. Refer to paragraph "CONFIGURE GSM/Modem AT Command Lines".

CONFIGURE GSM/Modem AT Command Lines

For **<GPRS/Internet: Yes>** in **CONFIGURE XX Device**, this screen consists of two pages. The following table lists the fields of both pages.

Description of fields

Field	Option	Description
<Init 1:>	User input	Initilisation sequence to initilise digital cellular phone/modem.
<(cont):>	User input	Allows the **<Init X:>** or the **<Connect:>** string to continue onto a new line.
<Init 2:>	User input	Initilisation sequence to initilise digital cellular phone/modem.
<Dial:>	User input	Dialing string used to dial the phone number.
<Hangup:>	User input	Hangup sequence used to end the network connection.
<Escape:>	User input	Escape sequence used to switch to the command mode before using the hangup sequence.
<Connect:>	User input	Dialing string used to dial into the Internet.

When the device is used, between **<Init 1:>** and **<Init 2:>**, a check for the PIN is performed.

Next step

Step	Description
1.	**STORE (F1)** returns to **CONFIGURE XX Device**.
2.	**STORE (F1)** returns to the screen from where **CONFIGURE XX Device** was accessed.

21 Config...\Interfaces... - Editing the Interface

21.1 GSI Output

Description

Data is stored directly to the RS232 and to the active job. GSI data is stored if **<Use Interface: Yes>** and either **ALL (F1)** or **REC (F3)** is pressed. The format depends on the selected option in **<GSI Format:>**.

Access

Select **Main Menu: Config...\Interfaces...**. Highlight **GSI Output**. **EDIT (F3)**.

CONFIGURE GSI Output

Description of fields

Field	Option	Description
<Use Interface:>	**Yes** or **No**	Activates the interface.
<Port:>	Choicelist	Available if **<Use Interface: Yes>**. Port to be used.
<Device:>	Output	Available if **<Use Interface: Yes>**. Device to be used.
<Protocol:>	**RS232 GSI** or **None**	Available if **<Use Interface: Yes>**. Protocol defines if the system expects a handshake or not.
<GSI Format:>	Choicelist	Available if **<Use Interface: Yes>**.

Next step

CONT (F1) returns to the screen from where **CONFIGURE GSI Output** was accessed.

21.2 GeoCOM Mode

Description

The GeoCOM Mode permits communication of the TPS1200+ with a 3rd party device.

Access

Select **Main Menu: Config...\Interfaces...**. Highlight **GeoCOM Mode**. **EDIT (F3)**.

CONFIGURE GeoCOM Mode

Description of fields

Field	Option	Description
<Use Interface:>	**Yes** or **No**	Activates the interface.
<Port:>	Choicelist	Available if **<Use Interface: Yes>**. Port to be used.
<Device:>	Output	Available if **<Use Interface: Yes>**. Device to be used.
<Protocol:>	Output	Available if **<Use Interface: Yes>**. Protocol to be used.

Next step

CONT (F1) returns to the screen from where **CONFIGURE GeoCOM Mode** was accessed.

21.3 RCS Mode

Description

RCS stands for Remote Control Surveying. This enables the instrument to be remotely controlled by an RX1200.

Access

Select **Main Menu: Config...\Interfaces...**. Highlight **RCS Mode**. **EDIT (F3)**.

CONFIGURE RCS Mode

Description of fields

Field	Option	Description
<Use Interface:>	**Yes** or **No**	Activates the interface.
<Port:>	Choicelist	Available if **<Use Interface: Yes>**. Port to be used.
<Device:>	Output	Available if **<Use Interface: Yes>**. Device to be used.
<Protocol:>	Output	Available if **<Use Interface: Yes>**. Protocol to be used.

Next step

CONT (F1) returns to the screen from where **CONFIGURE RCS Mode** was accessed.

21.4 Export Job

Description

- The Export Job interface allows data from a job to be exported from the instrument to an external device.
- The settings on this screen define the port and the device to which the data should be exported.

Access

Select **Main Menu: Config...\Interfaces...**. Highlight **Export Job**. **EDIT (F3)**.

CONFIGURE Export Job Interface

The availability of the fields depend on the setting for **<Device:>**.

Description of fields

Field	Option	Description
<Use Device:>	**Yes** or **No**	Activates the interface.
<Port:>	Choicelist	Available if **<Use Interface: Yes>**. Port to be used.
<Device:>	Output	The device currently assigned to the selected port within the active configuration set. The device which is selected determines the availability of the next fields.

Next step

CONT (F1) returns to the screen from where **CONFIGURE Export Job Interface** was accessed.

21.5 GPS RTK

Description

- The settings on this screen allow real-time related parameters to be configured. This includes defining if SmartStation should work as a rover and the real-time messages to be used.
- Refer to "23.1 Real-Time Mode" for detailed information.

21.6 Internet

Description

The Internet interface:

- allows accessing the Internet using SmartStation and a GMS/Modem device.
- can be used together with the GPS RTK interface to receive real-time data from a NTRIPCaster via Internet communication.

Access

Select **Main Menu: Config...\Interfaces...**. Highlight Internet. **EDIT (F3)**.

CONFIGURE Internet Interface

Description of fields

Field	Option	Description
<Internet:>	**Yes** or **No**	Activates the Internet interface.
<Port:>	Choicelist	Available if **<Use Interface: Yes>**. Port to be used.
<Device:>	Output	Available if **<Use Interface: Yes>**. Device to be used.
<IP Address:>	**Dynamic**	Each time SmartStation wants to access the Internet via the device a new IP address is assigned to the instrument. When using GMS/Modem to connect to the Internet then the network provider always dynamically assigns the IP address.
	Static	Each time SmartStation wants to access the Internet via the device the same IP address identifies the instrument. Thsis is important if SmartStation is used as a TCP/IP server. This option should only be selected if a static IP address is available for SmartStation.
<Set IP Adr:>	User input	Available for **<IP Address: Static>**. To set the IP address.
<User ID:>	User input	Some providers ask for a user ID to allow connecting to the Internet via GMS/Modem. Contact your provider if a user ID needs to be used. It is possible to show/hide the User ID. Refer to "24.5 Licence Keys" for further details.
<(cont):>	User input	Allows the **<User ID:>** string to continue onto a new line.
<Password:>	User input	Some providers ask for a password to allow connecting to the Internet via GMS/Modem. Contact your provider if a password is required.

Next step

CONT (F1) returns to the screen from where **CONFIGURE Internet Interface** was accessed.

22 Config...\Interfaces... - Controlling the Device

22.1 Digital Cellular Phones

Description

For digital cellular phones, information such as:

- the reference stations that can be contacted
- the phone numbers of the reference stations and
- the type of protocol to be used

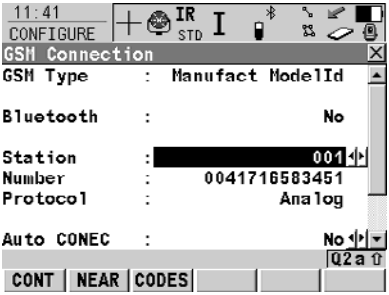
can be defined.

Access

Refer to "20.3.3 Controlling a Device" to access **CONFIGURE XX Connection**.

CONFIGURE XX Connection

The name of the screen depends on the type of technology of the digital cellular phone chosen in **CONFIGURE Interfaces**.



CONT (F1)
To accept the change and to continue with the subsequent screen.

NEAR (F2)
Available when reference stations to dial are already created in **CONFIGURE Stations to Dial**. To find the nearest reference station with a digital cellular phone.

CODES (F3)
Available for digital cellular phones of GSM technology. To enter the **P**ersonal **I**dentification **N**umber of the SIM card.

SRCH (F4)
Available for **<Bluetooth: Yes>**. To search for all available Bluetooth devices.

SHIFT INFO (F2)
Available for CDMA digital cellular phones. To find out information about the digital cellular phone.

SHIFT REG (F3)
Available for CDMA digital cellular phones. To register the digital cellular phone.

SHIFT CMND (F4)
To send AT commands to the digital cellular phone.

Description of fields

Field	Option	Description
<GSM Type:>	Output	Available for digital cellular phones of GSM technology. The type of digital cellular phone highlighted when **CONFIGURE XX Connection** was accessed.
<CDMA Type:>	Output	Available for digital cellular phones of CDMA technology. The type of digital cellular phone highlighted when **CONFIGURE XX Connection** was accessed.
<Bluetooth:>	**Yes** or **No**	SmartStation detects automatically if the attached device is bluetooth capable. Some devices ask for the identification number of the Bluetooth. The identification number of Leica's Bluetooth is 0000.
<ID Address:>	User input	Available for **<Bluetooth: Yes>**. The ID address of the Bluetooth device to be used. Refer to the device's user manual for information about the ID address.
<Station:>	Choicelist	The digital cellular phone reference station to be dialed. Opening the choicelist accesses **CONFIGURE Stations to Dial** where new reference stations can be created and existing reference stations can be selected or edited.
<Number:>	Output	The number of the digital cellular phone at the selected **<Station:>** as configured in **CONFIGURE Stations to Dial**.
<Protocol:>	Output	Available for digital cellular phones of GSM technology. The configured protocol of the digital cellular phone at the selected **<Station:>** as configured in **CONFIGURE Stations to Dial**.
<Auto CONEC:>	**Yes** or **No**	Allows for automatic connection between the rover and the reference when a point is occupied during a survey.
<Net Data Rate:>	**Auto-bauding**, **2400 bps** to **56000 bps**	Available for digital cellular phones of GSM technology. The network baud rate. Select **Auto-bauding** for an automatic search of the network baud rate. For digital cellular phones of GSM technology that do not support autobauding choose the baud rate from the choicelist.
<Connection:>		Available for digital cellular phones of GSM technology. Define if the digital cellular phone uses **R**adio **L**ink **P**rotocol.
	Transparent	For digital cellular phones that do not use RLP.
	Non-Transparent	For digital cellular phones that use RLP.

Next step

IF the digital cellular phone is	THEN
not of type CDMA or does not need to be registered	**CONT (F1)** to accept the change and to continue with the subsequent screen.
of type CDMA and needs registering	**SHIFT REG (F3)** to access **CONFIGURE CDMA Registration**. Refer to paragraph "CONFIGURE CDMA Registration".

CONFIGURE CDMA Registration

Description of fields

Field	Option	Description
<Prog Code:>	User input	The service program coder provided by the network provider.
<My Phone No:>	User input	Type in the mobile directory number provided by the network provider.

Next step

Step	Description
1.	**CONT (F1)** returns to **CONFIGURE Interfaces**.
2.	**CONT (F1)** returns to the screen from where **CONFIGURE Interfaces** was accessed.

22.2 Modems

Description

For modems, information such as:

- the reference stations that can be contacted and
- the phone numbers of the reference stations can be controlled.

Configure modem connection step-by-step

The following table explains the most common settings. Refer to the stated chapter for more information on screens.

Step	Description
1.	Refer to "20.1.2 Configuring an Interface" to access **CONFIGURE Interfaces**.
2.	In **CONFIGURE Interfaces** highlight an interface which has a modem attached.
3.	**CTRL (F4)** to access **CONFIGURE Modem Connection**.
4.	CONFIGURE Modem Connection **<Modem Type:>** The type of modem highlighted when **CONFIGURE Modem Connection** was accessed. **<Station:>** The modem reference station to be dialled. Accesses **CONFIGURE Stations to Dial** where new reference stations can be created and existing reference stations can be selected or edited. **<Number:>** The number of the modem at the selected **<Station:>** as configured in **CONFIGURE Stations to Dial**. Select the modem reference station to be dialled.
☞	**NEAR (F2)** finds the nearest reference station with a modem. Available when reference stations to dial are already created in **CONFIGURE Stations to Dial**. Coordinates of these stations must be known.
5.	**CONT (F1)** returns to **CONFIGURE Interfaces**.

22.3 Radios for GPS Real-Time

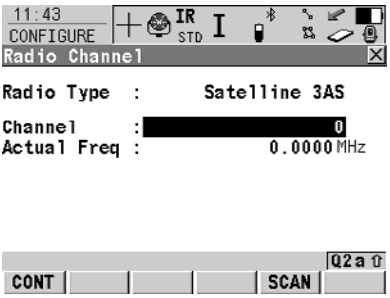
Description

For radios the channels on which the radio broadcasts can be changed. Changing channels changes the frequency at which the radio operates.

Access

Refer to "20.3.3 Controlling a Device" to access **CONFIGURE Radio Channel**.

CONFIGURE Radio Channel



CONT (F1)
To accept the changes and to continue with the subsequent screen.

SCAN (F5)
Available unless **<Set Channel: Auto>**. To find out information such as the station ID, latency and the data format of incoming signals from reference stations.

Description of fields

Field	Option	Description
<Radio Type:>	Output	The type of radio highlighted when **CONFIGURE Radio Channel** was accessed.
<Set Channel:>	Output	Available for **<Radio Type: AW100/2007400>**.
	Manually	The channel must be typed in manually.
	Auto	A reference selects the clearest frequency of the available channels. A rover searches for the channel wjhere data is transmitted.
<Channel:>	User input	Available unless **<Set Channel: Auto>**. The radio channel. The minimum and maximum allowed input values for a radio depend on the number of channels supported by the radio and the spacing between the channels.
<Actual Freq:>	Output	Available for Satelline 3AS radios. Displays the actual frequency of the radio.

22.4 Radios for Remote Control

Description

For radios the channels on which the radio broadcasts can be changed. Changing channels changes the frequency at which the radio operates. This may be necessary to enable multiple pairs of radios to work simultaneously in the same area without interferring with each other. The following radios for remote control support channel changing:

- TCPS27
- RadioHandle

Configure TCPS27/RH1200 connection step-by-step

Refer to the stated chapter for more information on screens.

Step	Description
1.	Access **CONFIGURE Interfaces**.
2.	Highlight the interface **RCS Mode** with either RadioHandle or TCPS27 attached as the device.
3.	**CTRL (F4)** to access **CONFIGURE TCPS27 / RH1200**.
4.	**CONFIGURE TCPS27 / RH1200**. **<Radio Type:>** The type of protocol, which is fixed as **RCS**. **<Link Number:>** The assigned channel number (from 0 to 15). The link number for the RX1200 controller and the radio must be the same. The communication settings for the RX1200 controller and the radio must also be same. **<Set as:>** The option **Remote** or **Base** are available. **Remote** sets the radio into remote mode. **Base** sets the radio into base mode. The radio modules inside the RX1200 controller and the radio must be set to opposite settings. It is recommended to set the RX1200 controller to **Remote** and the radio to **Base**.

22.5 RS232

Description

RS232 is a standard serial communication method that is able to transfer data without the need for predefined time slots. RS232 can be used, with a Bluetooth housing, to provide a wireless connection to another Bluetooth enabled device, for example, a computer.

Configure RS232 connection step-by-step

The following table explains the most common settings. Refer to the stated chapter for more information on screens.

Step	Description
1.	Refer to "20.1.2 Configuring an Interface" to access **CONFIGURE Interfaces**.
2.	In **CONFIGURE Interfaces** highlight an interface which has an RS232 device attached.
3.	**CTRL (F4)** to access **CONFIGURE RS232 Connection**.
4.	**CONFIGURE RS232 Connection** **<Device:>** The type of device highlighted when **CONFIGURE RS232 Connection** was accessed. **<Bluetooth:>** SmartStation detects automatically if the attached device is bluetooth capable. Some devices ask for the identification number of the Bluetooth. The identification number of Leica's Bluetooth is 0000. **<ID Address:>** Available for **<Bluetooth: Yes>**. The ID address of the Bluetooth device to be used. Refer to the device's user manual for information about the ID address.
☞	**SRCH (F4)** available for **<Bluetooth: Yes>**, to search for all available Bluetooth devices. If more than one Bluetooth device is found a list of available devices is provided.
☞	**SCAN (F5)** provides information such as the station ID, latency and the data format of incoming signals from reference stations. This information can be used to select appropriate reference stations to dial.
5.	**CONT (F1)** returns to **CONFIGURE Interfaces**.

22.6 GPRS / Internet Devices

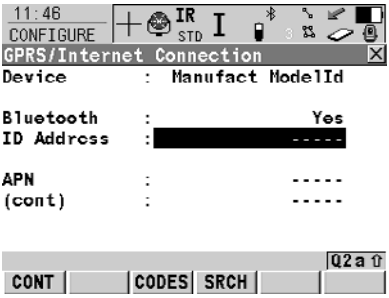
Description

GPRS / Internet devices can be used to access the Internet from TPS1200+ with Communication side cover.

Access

Refer to "20.3.3 Controlling a Device" to access **CONFIGURE GPRS/Internet Connection**.

CONFIGURE GPRS/Internet Connection



CONT (F1)
To accept the changes and to continue with the subsequent screen.

CODES (F3)
Available for digital cellular phones of GSM technology. To enter the **P**ersonal **I**dentification **N**umber of the SIM card. If the PIN is locked for any reason, input the **P**ersonal **U**nbloc**K**ing code for access to the PIN.

SRCH (F4)
Available for **<Bluetooth: Yes>**. To search for all available Bluetooth devices.

SHIFT CMND (F4)
To send AT commands to the GPRS / Internet device.

Description of fields

Field	Option	Description
<Device:>	Output	The type of GPRS / Internet device highlighted when **CONFIGURE GPRS/Internet Connection** was accessed.
<Bluetooth:>	Output	SmartStation detects automatically if the attached device is bluetooth capable. Some devices ask for the identification number of the Bluetooth.
<ID Address:>	User input	Available for **<Bluetooth: Yes>**. The ID address of the Bluetooth device to be used. Refer to the device's user manual for information about the ID address.
<APN:>	User input	Available for some GPRS / Internet devices. The **A**ccess **P**oint **N**ame of a server from the network provider, which allows access to data services. Contact your provider to get the correct APN. Mandatory for using GPRS.

22.7 Internet

☞ The Internet connection is available for SmartStation.

Description

The Internet connection allows SmartStation to be connected to the Internet to receive real-time data. A GPRS / Internet device must be attached.

Requirements

- **<Internet: Yes>** in **CONFIGURE Internet Interface**.
- **<Port: NETx>** assigned to an interface in **CONFIGURE Interfaces**.

Configure port NET step-by-step

Step	Description
1.	Refer to "20.1.2 Configuring an Interface" to access **CONFIGURE Interfaces**.
2.	**CONFIGURE Interfaces** Highlight an interface which has an Internet device attached.
3.	**CTRL (F4)** to access **CONFIGURE Set NET Port**.
4.	**CONFIGURE Set NET Port**, **General** page **<Name:>** The name of the port NET that was attached to the interface that was highlighted when this page was accessed. **<User:>** How SmartStation will operate in the Internet. **<User: Client>** must be selected when using NTRIP as Internet application. Inside the Internet NTRIPClients and NTRIPServers are considered as clients. **<User: Server>** must be selected when SmartStation is the server. **<IP Address:>** For **<User: Client>**: Type in the IP address of the server to be accessed in the Internet. For **<User: Server>**: Output of the IP address associated with the static IP address as configured in **CONFIGURE Internet Interface**. **<TCP/IP Port:>** A number can be assigned to each of the ports. Type in the NET port number. **<Auto CONEC:>** Available for **<User: Client>**. For **<R-Time Mode: Rover>** in **CONFIGURE Real-Time Mode** Allows for automatic connection between the rover and the Internet when a point is occupied during a survey. Ending the point occupation also ends the Internet connection.
5.	**PAGE (F6)** to access **CONFIGURE Set NET Port**, **Ranges** page
6.	**CONFIGURE Set NET Port**, **Ranges** page For **<User: Server>** in **CONFIGURE Set NET Port**, **General** page, the fields are input fields. The fields **<Range X From:>** and **<Range X To:>** can be used to prevent a user with an IP address outside the defined ranges from accessing the instrument. Enter the IP address ranges.
☞	**CLEAR (F5)** returns the fields back to their default values.

Step	Description
7.	**CONT (F1)** returns to the screen from where **CONFIGURE Set NET Port** was accessed.

22.8 Creating a New Station to Dial/Editing a Station to Dial

Description

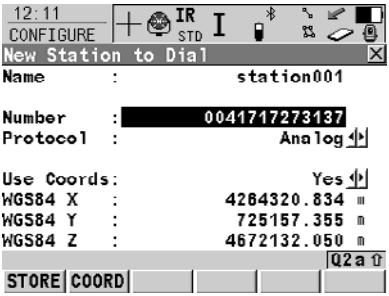
CONFIGURE Stations to Dial allows new stations to be created, provides a list of reference stations that can be dialed and allows existing stations to be edited.
For digital cellular phones of any technology and for modems, the phone numbers of the device at the reference station must be known. For a reference station to be dialed, a name, the phone number and, if available, the coordinates can be configured.
The configuration is possible for rover and reference digital cellular phones and modems.

Access step-by-step

Step	Description
1.	Refer to "20.3.3 Controlling a Device" to access **CONFIGURE XX Connection/CONFIGURE Radio Channel**.
2.	Open the choicelist for **<Station:>** to access **CONFIGURE Stations to Dial**.
3.	**CONFIGURE Station to Dial** If a station is to be edited, then highlight the station.
4.	**NEW (F2)/EDIT (F3)** to access **CONFIGURE New Station to Dial/CONFIGURE Edit Station to Dial**.

Editing a station to dial is similar to creating a new station to dial. For simplicity the screens are called **CONFIGURE XX Station to Dial** and differences are clearly outlined.

CONFIGURE XX Station to Dial



STORE (F1)
To store the changes and to continue with the subsequent screen.

COORD (F2)
To view other coordinate types.

SHIFT ELL H (F2) or **SHIFT ORTH (F2)**
Available for local coordinates. To change between the ellipsoidal and the orthometric height.

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the new reference station to be dialed. The name may be up to 16 characters long and may include spaces. Input optional.

Field	Option	Description
<Number:>	User input	The number of the reference station to dial. If the survey is to be undertaken across country borders it is necessary to input the phone number using standard international dialing codes. For example, +41123456789. Otherwise it can be input as a standard digital cellular phone number.
<Protocol:>		Available for digital cellular phones of GSM technology. The configured protocol of the digital cellular phone of GSM technology.
	Analog	For conventional phone networks.
	ISDN v. 110	For GSM networks.
<Enter Coords:>	**Yes** or **No**	Allows the coordinates of the reference station to be entered.
Coordinates	User input	The coordinate of the reference station.

Next step

Step	Description
1.	**STORE (F1)** stores the changes and returns to **CONFIGURE Stations to Dial**.
2.	**CONT (F1)** returns to the screen from where **CONFIGURE Stations to Dial** was accessed.

22.9 Creating a New Server to Connect/Editing a Server to Connect

Description

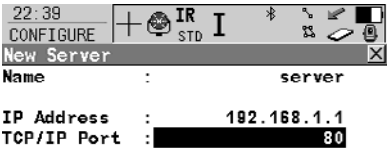
CONFIGURE Server to Connect allows new servers to be created, provides a list of servers to be connect in the internet and allows existing servers to be edited. For servers to be accessed in the Internet the IP address and the TCP/IP port must be known. For a server to be accessed in the Internet a name can be configured.

Access step-by-step

Step	Description
1.	Refer to "20.3.3 Controlling a Device" to access **CONFIGURE XX Connection/CONFIGURE Radio Channel**.
2.	Open the choicelist for **<Server:>** to access **CONFIGURE Server to Connect**.
3.	**CONFIGURE Server to Connec**t If a server is to be edited, then highlight the server.
4.	**NEW (F2)/EDIT (F3)** to access **CONFIGURE New Server to Connect/CONFIGURE Edit Server to Connect**.

Editing a server to connect is similar to creating a new server to connect. For simplicity the screens are called **CONFIGURE XX Server to Connect** and differences are clearly outlined.

CONFIGURE XX Server to Connect



STORE (F1)
To store the changes and to continue with the subsequent screen.

Description of fields

Field	Option	Description
<Name:>	User input	A unique name for the new server to be accessed in the Internet. The name may be up to 16 characters long and may include spaces.
<IP Address:>	User input	The IP address of the server to be accessed in the Internet.
<TCP/IP Port:>	User input	The port of the Internet server through which the data is provided. Each server has several ports for various services.

Next step

Step	Description
1.	**STORE (F1)** stores the changes and returns to **CONFIGURE Server to Connect**.
2.	**CONT (F1)** returns to the screen from where **CONFIGURE Server to Connect** was accessed.

23 Config...\SmartStation...

23.1 Real-Time Mode

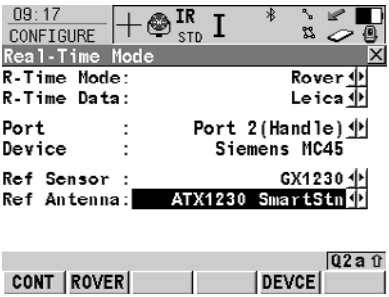
Description

The settings on this screen allow GPS real-time related parameters to be configured. This includes defining whether SmartStation should operate as a rover (static, as on a tripod) and the type of GPS real-time messages to be used.

Access

Select **Main Menu: Config...\SmartStation...\Real-Time Mode**.

CONFIGURE Real-Time Mode



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

ROVER (F2)
To configure additional settings relevant to rover operations.

DEVCE (F5)
To create, select, edit or delete a device.

Description of fields

Field	Option	Description
<R-Time Mode:>	**None**	SmartStation is not to be used as a GPS real-time rover.
	Rover	Activates a rover GPS real-time interface.
<R-Time Data:>	Choicelist	The GPS real-time data format which is to be received from the reference station.
<Port:>		Port to which the device is attached.
	Port 1	For communication and/or power. This port is located at the base of the instrument. For TPS1200+: 5 pin LEMO-0
	Port 2 (Handle)	Hotshoe connection for RadioHandle with RCS and SmartAntenna Adapter with SmartStation. This port is located on top of Communication side cover.
	Port 3 (BT)	Bluetooth module for communication with only Bluetooth capable devices. This port is housed within Communication side cover.
	NETx	Available for an activated Internet interface. If these ports are not assigned to a specific interface, then these ports are additional remote ports.

Field	Option	Description
<Ref Sensor:>	Choicelist	The receiver type used at the reference. If the GPS real-time data format does not contain the information of the receiver type certain corrections based on the information of the receiver type are applied in order to provide correct results. The GPS real-time data formats **Leica**, **CMR** and **CMR+** contain this information. This is mainly important when a System300 receiver is used as reference.
<Ref Antenna:>	Choicelist	The antenna used at the reference. If the GPS real-time data format does not contain the information of the antenna certain corrections based on the information of the antenna are applied in order to provide correct results. The GPS real-time data formats **Leica**, **RTCM v2.3**, **CMR** and **CMR+** contain this information. If the reference data is corrected by absolute antenna calibration values and a Leica standard antenna is being used on the rover, select **ADVNULLANTENNA** as reference antenna.

CONFIGURE Additional Rover Options, General page

The available fields depend on the selected **<R-Time Data:>** in **CONFIGURE Real-Time Mode**.

CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

GGA (F4)
To activate the sending of a GGA message for reference network applications.

GETID (F5)
Available for **<Accept Ref: User Defined>**. To display and select the station ID of the available reference stations, the latency of the message and the data format. When using radios, the radio channel can be switched and the stations received on the new frequency are displayed.

1st (F6)
Available for **<Accept Ref: First Received>**. To force the system to try to establish a new connection with a different reference station.

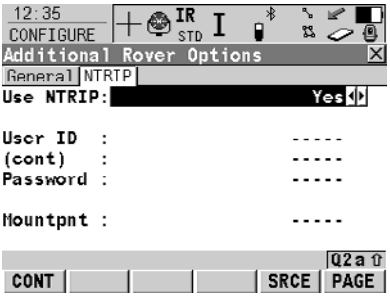
Description of fields

Field	Option	Description
<Accept Ref:>		The reference station of which GPS real-time data is to be accepted.
	User Defined	Incoming GPS real-time data is accepted from the reference station defined in **<Ref Stn ID:>**.
	First Received	Incoming GPS real-time data from the first recognised reference station is accepted.
	Any Received	Incoming GPS real-time data from any reference station is accepted.
<Ref Stn ID:>	User input	Available for **<Accept Ref: User Defined>**. The special ID of the reference station from which GPS real-time data is to be received. The allowed minimum and maximum values vary.
	From **0** to **31**	For **<R-Time Data: Leica>** and **<R-Time Data: CMR/CMR+>**.
	From **0** to **1023**	For **<RTCM Version: 1.x>** and **<RTCM Version: 2.x>**.
	From **0** to **4095**	For **<R-Time Data: RTCM v3.1>**.
<Ref Network:>	**None**, **VRS** or **FKP**	Defines the type of reference network to be used.
<Send User ID:>	**Yes** or **No**	Activates the sending of a Leica proprietary NMEA message defining the user.
<User ID 1:> and **<User ID 2:>**	User input	Available for **<Send User ID: Yes>**. The specific user ID's to be sent as part of the Leica proprietary NMEA message. By default the serial number of the instrument is displayed.
<RTCM Version:>	**1.x**, **2.1**, **2.2** or **2.3**	Available for **<R-Time Data: RTCM XX v2>** in **CONFIGURE Real-Time Mode**. The same version must be used at the reference and the rover.
<Bits / Byte:>	**6** or **8**	Defines the number of bits/byte in the RTCM message being received.

Next step

PAGE (F6) changes to the **NTRIP** page.

CONFIGURE Additional Rover Options, NTRIP page



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

SRCE (F5)
To download the NTRIP source table if **<Mountpnt:>** is unknown. To do this, the GPRS Internet interface must already be configured.

Description of fields

Field	Option	Description
<Use NTRIP:>	**Yes** or **No**	Activates NTRIP.
<User ID:>	User input	A user ID is required to receive data from the NTRIPCaster. Contact the NTRIP administrator for information.
<(cont):>	User input	Allows the **<User ID:>** string to continue onto a new line.
<Password:>	User input	A password is required to receive data from the NTRIPCaster. Contact the NTRIP administrator for information.
<Mountpnt:>	User input	The NTRIPSource from where GPS real-time data is required.

Next step

Step	Description
1.	**CONT (F1)** returns to **CONFIGURE Real-Time Mode**.
2.	**CONT (F1)** returns to **TPS1200+ Main Menu**.

23.2 Point Occupation Settings

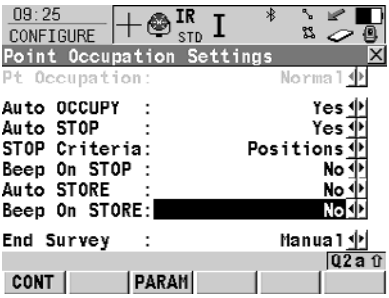
Description

The settings on this screen define the way in which points are occupied and recorded.

Access

Select **Main Menu: Config...\SmartStation...\Point Occupation Settings**.

CONFIGURE Point Occupation Settings



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

PARAM (F3)
To configure the time interval after which a point occupation can be stopped automatically.

Description of fields

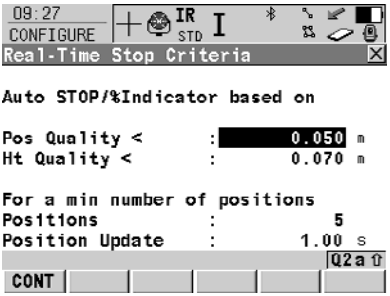
Field	Option	Description
<Pt Occupation:>	Normal	The way in which coordinates for a point are recorded. This field is fixed to **<Pt Occupation: Normal>**.
<Auto OCCUPY:>	No	Starts point occupation when pressing **OCUPY (F1)**.
	Yes	Starts point occupation automatically when entering **SETUP New Station Point**.
	Timed	Starts point occupation automatically at a certain time. The start time is specified in **SETUP New Station Point**.
<Auto STOP:>	**Yes** or **No**	Stops the measurements automatically when the parameter defined for **<STOP Criteria:>** reaches 100 %.
<STOP Criteria:>		Available for **<Auto STOP: Yes>**. Defines the method used for **<Auto STOP:>**. The setting determines the computation of the duration of the point occupation. Parameters for the selected method are defined with **PARAM (F3)**.
	Accuracy or **Positions**	Available for **<R-Time Mode: Rover>**.

Field	Option	Description
	Time, **Observations** or **No. of Satellites**	Available for **<R-Time Mode: None>**.
<% Indicator:>		Available for **<Auto STOP: No>**. This is an indicator when to stop the point occupation. Parameters for the selected method are defined with **PARAM (F3)**.
	None or **Positions**	Available for **<R-Time Mode: Rover>**.
	None, **Time**, **Observations** or **No. of Satellites**	Available for **<R-Time Mode: None>**.
<Beep On STOP:>	**Yes** or **No**	Activates that a beep is made when the point occupation is ended by **<Auto STOP:>**.
<Auto STORE:>	**Yes** or **No**	Stores points automatically after stopping the point occupation.
<Beep On STORE:>	**Yes** or **No**	Activates that a beep is made when the point is stored by **<Auto STORE:>**.
<End Survey:>		Defines the instrument behaviour once a point is stored.
	Manual	Exits **GPS SURVEY** when pressing **ESC**.
	Automatically	Exits **GPS SURVEY** automatically when pressing **STORE (F1)** and returns to main menu.

Next step

IF parameters for <Auto STOP:>	AND	THEN
are not to be configured	-	**CONT (F1)** closes the screen and returns to the screen from where **CONFIGURE Point Occupation Settings** was accessed.
are to be configured	<R-Time Mode: None>	**PARAM (F3)** changes to **CONFIGURE Post-Process Stop Criteria**.
are to be configured	<R-Time Mode: Rover>	**PARAM (F3)** changes to **CONFIGURE Real-Time Stop Criteria**. Refer to paragraph "CONFIGURE Real-Time Stop Criteria".

CONFIGURE Real-Time Stop Criteria



CONT (F1)

To accept changes and to return to **CONFIGURE Point Occupation Settings**

Description of fields

The parameters shown on this screen depend on the setting for **<STOP Criteria:>** in **CONFIGURE Point Occupation Settings**.

Field	Option	Description
<Pos Quality <:> and **<Ht Quality <:>**	User input	Sets the maximum position and height qualities for each point occupation. Calculating the qualities starts when **OCUPY (F1)** is pressed. SmartStation stops measuring when the position and height qualities are both less than the configured values.
<Positions:>	User input	Point is occupied for a minimum number of positions even when the **<Pos Quality <:>** and **<Ht Quality <:>** is already less than the specified maximum.
<Positions Update>	User input	Sets the number the positions which must be observed before SmartStation stops measuring. Counting the number of positions starts when **OCUPY (F1)** is pressed.

Next step

Step	Description
1.	**CONT (F1)** returns to **CONFIGURE Point Occupation Settings**.
2.	**CONT (F1)** returns to **TPS1200+ Main Menu**.

23.3 Satellite Settings

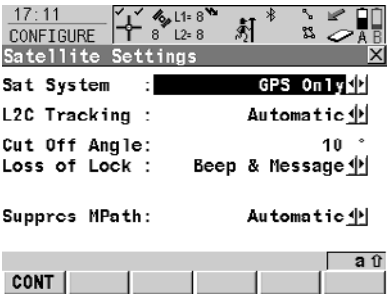
Description

The settings on this screen define which satellite system (available for SmartStation wih ATX1230 GG), satellites and satellite signals will be used by the receiver.

Access

Select **Main Menu: Config...\SmartStation...\Satellite Settings**.

CONFIGURE Satellite Settings



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

Description of fields

Field	Option	Description
<Sat System:>		Available for SmartStation/ATX1230 GG. Defines the satellite signals accepted by the receiver when tracking satellites.
	GPS Only	Only GPS satellites are tracked.
	GPS & Glonass	GPS and GLONASS satellites are tracked.
<L2C Tracking:>	**Automatic** or **Always Track**	Available for SmartStation/ATX1230 GG. Defines if the L2C signal will be tracked. The recommended setting is **Automatic**.
<Cut Off Angle:>	User input	Sets the elevation in degrees below which satellite signals are not recorded and are not shown to be tracked. Recommended settings: For GPS real-time: 10°. For other applications: 15°.
<Loss of Lock:>	**Beep & Message** or **No Beep/Message**	Activates an acoustic warning signal and message given by SmartStation when satellites are lost and therefore no position can be computed.
<Suppress MPath>	**Automatic** or **Always On**	Available for SmartStation/ATX1230 GG. Defines if phase multipath mitigation techniques will be used. The recommended setting is **Automatic**.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

23.4 Local Time Zone

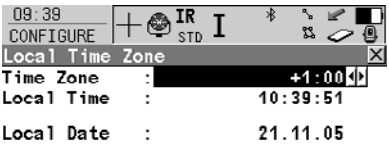
Description

The settings on this screen help SmartStation to quickly locate and track satellites.

Access

Select **Main Menu: Config...\SmartStation...\Local Time Zone**.

CONFIGURE
Local Time Zone



CONT (F1)
To accept changes and return to **TPS1200+ Main Menu**.

Description of fields

Field	Option	Description
<Time Zone:>	From -**13:00** to **+13:00**	The time zone for the current location and local date.
<Local Time:> **<Local Date:>**	User input	Setting the local time and date supports a very fast satellite acquisition.

Next step
CONT (F1) returns to **TPS1200+ Main Menu**.

23.5 Quality Control Settings

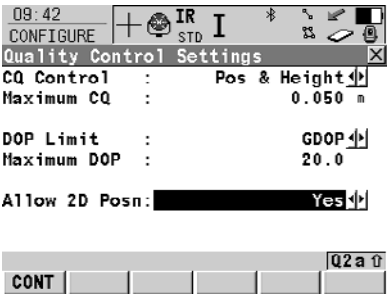
Description

The settings on this screen define the limits for coordinate quality and DOP values accepted for point occupations.

Access

Select **Main Menu: Config...\SmartStation...\Quality Control Settings**.

CONFIGURE Quality Control Settings



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

Description of fields

Field	Option	Description
<CQ Control:>	**None**, **Pos Only**, **Height Only** or **Pos & Height**	The type of coordinate quality to be checked before storing a point. If activated, the limit defined in **<Maximum CQ:>** is checked before storing a point. A warning signal is given when the limit is exceeded.
<Maximum CQ:>	User input	Available unless **<CQ Control: None>**. The maximum acceptable coordinate quality.
<DOP Limit:>	**None**, **GDOP**, **PDOP**, **HDOP** or **VDOP**	If activated, the limit defined in **<Maximum DOP:>** is checked. GPS positions are unavailable when the limit is exceeded.
<Maximum DOP:>	User input	Available unless **<DOP Limit: None>**. The maximum acceptable DOP value.
<Allow 2D Posn:>	Yes	2D positions can be obtained with only three satellites available. The height is fixed to that of the last position computed with height.
	No	2D positions cannot be obtained with only three satellites available.

Next step

CONT (F1) returns to **TPS1200+ Main Menu**.

23.6 Logging of Raw Obs

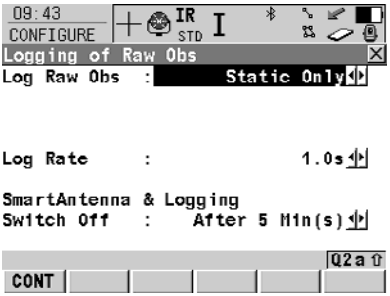
Description

- With SmartStation it is possible to add the ability to log raw GPS data, which is then post-processed at the office.
- The settings on this screen define the logging of raw observations.
- This is a protected option and is only activated by the entry of a license key.

Access

- This menu option is licence protected and is only activated by the entry of a licence key. The licence key can only be loaded from the CompactFlash card.
- Select **Main Menu: Config...\SmartStation...\Logging of Raw Obs**.

CONFIGURE Logging of Raw Obs



CONT (F1)
To accept changes and return to the screen from where this screen was accessed.

Description of fields

Field	Option	Description
<Log Raw Obs:>	**Never**	Available unless **<R-Time Mode: Reference>**. No raw observation logging during either static or moving intervals.
	Static Only	Available unless **<R-Time Mode: Reference>**. Raw observation logging during static intervals when occupying a point.
<Log Rate:>	From 0.05s to 300.0s	Available unless **<Log Raw Obs: Never>** or **<Log Raw Obs: No>**. Rate at which raw observations are logged.
<Switch Off:>	Choicelist	This option determines when Smart-Antenna is turned off. The selected time is activated whenever SmartStation leaves GPS mode. This option is directly linked to **<Switch Off:>** in **CONFIGURE Start Up & Power Down**. Refer to "19.6 Start Up & Power Down" for details.

Next step
CONT (F1) returns to **TPS1200+ Main Menu**.

24 Tools...

24.1 Format Memory Device

Description

Allows the CompactFlash card, the internal memory, if fitted, and the System RAM to be formatted. All data will be erased.

Access

Select **Main Menu: Tools...\Format Memory Device**.

Way of working step-by-step

Step	Description
1.	Select the memory device to be formatted.
2.	Select the type of format to be performed. ☞ A quick format means that after formatting, data is not visible any more but still exists on the memory device and is overwritten as and when required. A complete format fully deletes the data.

Next step

IF	THEN
the CompactFlash card or internal memory is to be formatted	**CONT (F1)** to format the selected memory device and return to **TPS1200+ Main Menu**.
the application programs memory is to be formatted	**PROGS (F4)** to format the application programs memory. All loadable application programs are deleted.
the System RAM is to be formatted	**SYSTM (F5)** to format the System RAM.

☞ If the System RAM is formatted all system data such as user defined configuration sets, codelists, geoid field files and CSCS field files will be lost.

24.2 Transfer Objects...

Description

This chapter describes the basic procedure for transferring objects between the CompactFlash card, the System RAM and the internal memory, if fitted.

Access

Select **Main Menu: Tools...\Transfer Objects...\XX**.

Way of working step-by-step

Step	Description
☞	The available fields on the screen depend on the option selected in **Main Menu: Tools...\Transfer Objects...**.
1.	Select the memory device to transfer the object from.
2.	Select the memory device to transfer the object to.
3.	Select the object to transfer.

Next step

IF all XX	THEN
are to be transferred	**ALL (F3)** transfers all objects in list.
are not to be transferred	**CONT (F1)** transfers selected object.

24.3 Upload System Files...

Description

- Instrument firmware, system languages and application programs can be loaded onto the instrument either:
  - directly from the CompactFlash card inserted into the instrument, or
  - with LGO by using a serial cable connected to port 1 on the instrument.
- When uploading files from the CompactFlash card, the files to be loaded are to be stored in the /System directory.

Whichever method is used to load these files it is important that a fully loaded battery is inserted into the instrument (an external power supply can also be used). Loading these files can take some time and the power supply must not be interrupted during the loading process.

SmartAntenna must always be connected to the instrument when uploading the instrument firmware because the firmware for the measurement engine is included into the instrument firmware.

Access

Select **Main Menu: Tools...\Upload System Files...\XX**.

Type of system files

Type	Name	Description
Instrument firmware	TPS1200+.fw	• Software comprising the central functions of the instrument. • Survey and Setup are integrated into the firmware and cannot be deleted. • English system language is integrated into the firmware and cannot be deleted.
	ME2.fw	• Software comprising the central functions of SmartAntenna.
System language	Sys_Lang.sxx	• System language file, where xx defines the language code. • A maximum of three languages (English and two other languages) can be stored at any one time.
Application programs	TPS_filename.axx	• Application program file, where xx defines the language code and filename defines the program name.

Upload procedures

Option 1 - upload from CompactFlash card

Step	Description
1.	Insert the CompactFlash card into the computer or CompactFlash card reader and copy the necessary files to be uploaded to the instrument to the /System directory of the CompactFlash card.

Step	Description
2.	Insert the CompactFlash card into the instrument and turn on the instrument. When the internal battery is used, ensure that the battery is fully charged.
3.	**Main Menu: Tools...\Upload System Files...\XX**.
4.	Select the necessary file to upload (firmware, language or application).
5.	**CONT (F1)** uploads the selected system file.

Option 1 - upload from LGO

Step	Description
1.	Connect the transfer cable to the computer and to port 1 on the instrument.
2.	Ensure that the appropriate interface is set: Interface (GeoCOM Mode), Port (1), Device (RS232 GeoCOM).
	Ensure that corresponding communication settings are set between the computer and the instrument.
3.	Choose Software Upload from the Tools menu in LGO.
4.	Select the necessary files to upload (firmware, language or application).

24.4 Calculator and File Viewer

Refer to TPS1200+ Technical Reference Manual for information on these functions.

24.5 Licence Keys

Description

A licence key can be used to activate application programs and protected options and can be used to define the expiry date of the software maintenance.
A licence key file can be uploaded to the instrument. To upload a licence key file the file should be located on the \SYSTEM directory of the CompactFlash card. Licence key files use the naming convention L_123456.key, where 123456 is the instrument serial number. Licence keys can also be typed in manually.

Access

Select **Main Menu: Tools...\Licence Keys**.

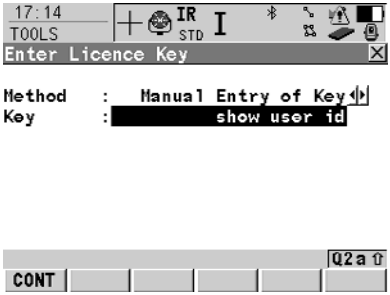
Way of working step-by-step

Step	Description
1.	Select the method by which the licence key will be input.
2.	Depending on the method chosen the licence key can be typed in.

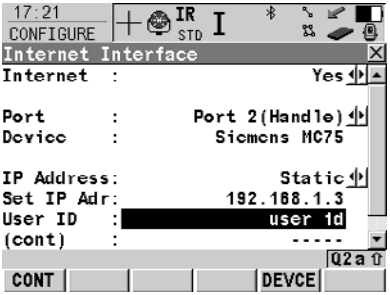
Showing/Hiding the User ID for the Internet Interface

Showing The User ID

1) Type "show user id" (not case sensitive) and press **CONT (F1)** to continue.

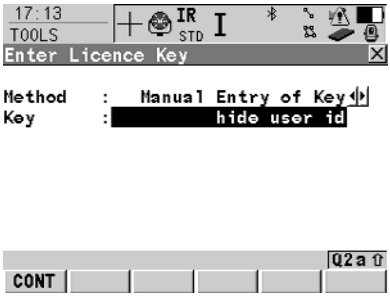


2) The user id will then always be displayed.

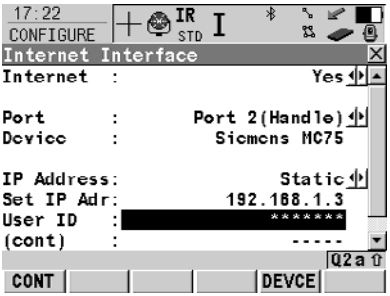


Hiding The User ID

1) Type "hide user id" (not case sensitive) and press **CONT (F1)** to continue.



2) The user id will then always be hidden.



24.6 Field to Office

Description

This is to transfer jobs, codelists and other System1200 related files on the CompactFlash Card with a standard and simple FTP server.
FTP protocol is used to transfer between System1200, which runs SmartWorx and has an internet device connected, and the ftp server. The zip/unzip functionality is included.

Supported files

The following list shows the support file extensions that will automatically move to the corresponding directory after downloading.

Supported file	File extension	Directory
Almanac file	Almanac.sys	DATA/GPS
Antenna file from GPS1200	List.ant	GPS
Application program files	*.a*	SYSTEM
ASCII files for import/export to/from job	*.txt	DATA
Coordinate system file from GPS1200	Trfset.dat	DBX
CSCS field files	*.csc	DATA/GPS/CSCS
DXF files for import/export to/from job	*.dxf	DATA
Firmware files	*.fw	SYSTEM
Format files	*.frt	CONVERT
Geoid field files	*.gem	DATA/GPS/GEOID
GSI files	*.gsi	GSI
GSM/Modem station list from GPS1200	*.fil	GPS
Language files	*.s*	SYSTEM
Licence file	*.key	SYSTEM
Logfiles created from application programs	*.log	DATA
TPS configuration files	*.xfg	CONFIG
System files	System.ram	SYSTEM
Custom ASCII file (LEICA Geo Office Export)	*.cst	DATA
Comma seperated variables, text file format (ASCII)	*.csv	DATA

☞ Internet interface should be configured and connected prior using this function. Refer to "22.6 GPRS / Internet Devices".

Access

Select **Main Menu: Tools...\Field to Office**.

Way of working step-by-step

Step	Description
1.	Type in the IP address. IP address format IPv6, for example 2001:0db8:85a3:08d3:1319:8a2e:0370:7334, is NOT supported.

Step	Description
2.	Type in a port. Any number between 0 and 65535 is valid.
3.	Type in the user ID. If no value is typed in, then the instrument logs into the FTP server anonymously.
4.	Type in the password.
5.	**CONEC (F1)**
6.	**TOOLS Field to Office**, **Field** page Once the connection to the FTP server is established, this screen is displayed. The files and folders on the CompactFlash Card of the instrument are displayed including their size. To get into the folders, highlight the folder and **ENTER**. Highlight an object and press **SEND (F1)**, to zip all the files belonging to the object and sending them to the FTP server.
☞	**UNZIP (F2)** unzips a zipped file in the download directory.
☞	**IMPRT (F3)** To move a file from the \Download folder to the appropriate directory folder based on it's file extension type. Available in the \Download folder when a file is highlighted. Unavailable for unrecognised files in the \Download folder. These must stay in the \Download folder.
☞	**SHIFT QUIT (F6)** returns to **TPS1200+ Main Menu** and disconnects automatically from the FTP server.
7.	**PAGE (F6)** changes to the **Office** page.
8.	**TOOLS Field to Office**, **Office** page The files located on the FTP server are displayed. Whenever switching to this page, a refresh action is done or it reconnects to the server if the connection to the server was disconnected.
☞	**RECV (F1)** downloads the highlighted file or folder list on the FTP server connected to the local download folder. Downloaded files are moved automatically to the corresponding directories if recongnised by the system. If not, they are stored in the download folder. Zipped file are unzipped before storing in the download folder.
☞	**SHIFT RFRSH (F5)** refreshes the FTP directory.

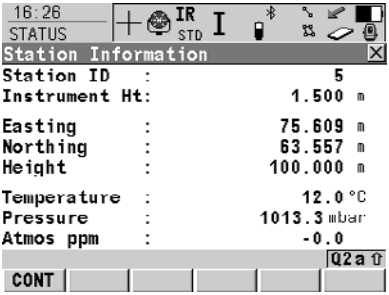
25 STATUS

25.1 STATUS: Station Information

Access step-by-step

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **Station Information**.

STATUS Station Information



CONT (F1)
To exit **STATUS Station Information**.

COORD (F2)
To change between the different coordinate types.

SHIFT ELL H (F2) or **SHIFT ORTH (F2)**
To change between ellipsoidal and orthometric height.

Description of fields

Field	Description
<Station ID:>	Station ID of the current station set-up.
<Instrument Ht:>	Instrument height of the current station set-up.
<Easting:>	Easting value of the instrument position.
<Northing:>	Northing value of the instrument position.
<Height:>, **<Local Ell Ht:>** or **<Ortho Ht:>**	If no coordinate system is selected the orthometric height **<Height:>** of the instrument position is displayed. For a selected coordinate system, orthometric or ellipsoidal height can be displayed.
<Temperature:>	Temperature set on the instrument.
<Pressure:>	Pressure set on the instrument.
<Atmos ppm:>	Atmospheric ppm set on the instrument.

Next step

CONT (F1) to exit **STATUS Station Information**.

25.2 STATUS: Battery & Memory

Access step-by-step

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **Battery & Memory**.

STATUS Battery & Memory, Battery page

Description of fields

Field	Description
Any field	The percentage of remaining power capacity for all batteries are displayed numerically. Batteries not in use are shown in grey. For internal and external battery being attached at the same time the internal battery is used until it is empty and then the external battery is used.

Next step

PAGE (F6) changes to the **Memory** page.

STATUS Battery & Memory, Memory page

If no information for a field is available, for example no CompactFlash card is inserted, then ----- is displayed.

Description of fields

Field	Description
<Device Used:>	The memory device in use.
<Mem CF Card:>	The total/free memory for data storage on the CompactFlash card.
<Mem Instrmnt:>	The total/free memory for data storage on the internal memory. A grey field and grey ----- indicate an unavailable internal memory.
<Mem Programs:>	The total/free system memory used for application programs.
<Mem System:>	The total/free system memory. The system memory stores • instrument related files such as system settings. • survey related files such as codelists and configuration sets.

Next step

CONT (F1) to exit **STATUS Battery & Memory**.

25.3 STATUS: System Information

Access step-by-step

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **System Information**.

STATUS System Information, Instrument page

Shows the type of instrument, the serial number, the currently active system language and displays available instrument hardware options such as ATR or PowerSearch.

Description of fields

Field	Description
<Instr Type:>	Type of instrument.
<Serial No.:>	Serial number of instrument, which is written on the type plate.
<Eqpmnt No.:>	Unique instrument number.
<Instrmnt ID.:>	User defined instrument identification.
<Sys Lnguage:>	Currently selected system language
<Reflectless:>	The reflectorless EDM to be PinPoint R400, R1000 or none.
<ATR:>	Instrument equipped with automated target recognition or not.
<PowerSearch:>	Instrument equipped with PowerSearch or not.
<GUS74:>	Instrument equipped with GUS74 or not.
<Extd GeoCOM:>	Instrument equipped with extended GeoCOM or not.
<L2C tracking:>	SmartStation option. The ability to track the L2C signal.
<MMT:>	SmartStation option. The availability of multipath mitigation.
<GLONASS ready:>	SmartStation option. The availability of GLONASS each Wed.
<GLONASS perm:>	SmartStation option. The permanent availability of GLONASS.

Next step
PAGE (F6) changes to the **Firmware** page.

STATUS System Information, Firmware page

Shows the versions of all system firmware.

Description of fields

Field	Description
<Firmware:>	Firmware version of the onboard software.
<Maintenance End:>	Expiry date of the software maintenance.

Field	Description
<Build User Iface:>	Build version of the onboard software.
<Build Processb.:>	Build version of the processor board.
<Telescope Fw:>	Firmware version of the telescope.
<Boot:>	Firmware version of the boot software.
<API:>	Firmware version for the application program interface.
<EF Interface:>	Firmware version for the electric front interface.
<Keyboard/ Display:>	Firmware version for the graphical user interface.

Next step
PAGE (F6) changes to the **Application** page.

STATUS System Information, Application page

Shows the versions of all uploaded application programs.

Next step
CONT (F1) exits **STATUS System Information**.

25.4 STATUS: Interfaces...

Description

The **STATUS Interfaces** screen gives an overview of all interfaces with the currently assigned port and the device.

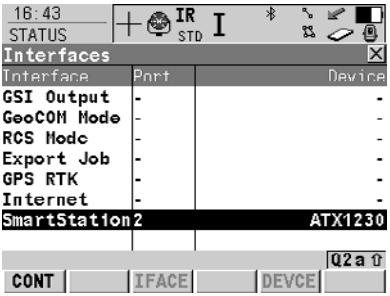
This screen shows information about incoming data from the following interfaces/devices:

- **Real-Time Input**
- **Meteo**
- **Remote Interfaces**
- **ASCII Input**
- **Event Input**
- **Bluetooth**
- **Tilt**
- **Internet**

Access step-by-step

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **Interfaces...**. **STATUS Interfaces**

STATUS Interfaces



CONT (F1)
To exit **STATUS Interfaces**.

IFACE (F3)
Available only when **GPS RTK** or **Internet,** with an assigned port and device, is highlighted.
To display status information about the data being transmitted through the selected interface.

DEVCE (F5)
Available only when **GPS RTK** or **Internet,** with an assigned port and device, is highlighted.
To display status information about the attached device.

25.5 STATUS: Bluetooth

STATUS Bluetooth

The way information is displayed indicates the configuration status of the Bluetooth port and the connection status of the device.

Information displayed	Bluetooth port configured	Device connected
in black	✓	✓
in grey	✓	-
as -----	-	-

25.6 STATUS: Level & Laser Plummet

Description

The electronic level is shown and can be centred.

Access step-by-step

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **Level & Laser Plummet**.

The level moves linear with the inclination values **<Tilt L:>** and **<Tilt T:>.** On the screen closest to the circular level, the electronic level moves down if the value in **<Tilt L:>** gets bigger and vice versa. If the value for **<Tilt T:>** gets bigger the level moves left and vice versa.

STATUS Level & Laser Plummet, Level page

Description of fields

Field	Description
<Tilt L:>	Longitudinal tilt of the vertical axis.
<Tilt T:>	Transversal tilt of the vertical axis.

Next step

PAGE (F6) changes to the **Laser Plummet** page.

STATUS Level & Laser Plummet, Laser Plummet page

Description of fields

Field	Option	Description
<Laser Plummet:>	**On** or **Off**	To turn the laser plummet on or off. Is always set on when accessing this screen. Changing this setting turns the laser plummet on or off immediately.
<Intensity:>	From **0 %** to **100 %**	The percentage of the intensity of the laser plummet is displayed numerically and graphically.

Next step

CONT (F1) exits **STATUS Level & Laser Plummet**.

25.7 STATUS SmartStation...

25.7.1 Satellite Status

Description

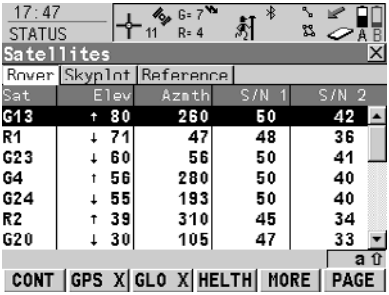
This screen shows information related to the satellites ordered by the elevation angle.

Access

Step	Description
1.	Press **USER** to access **TPS1200+ Main Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **SmartStation...**
4.	Select **Satellite Status**.

STATUS Satellites, Rover page

- The information about the satellites at the reference shown on the **Reference** page is identical with the information shown on **STATUS Satellites**, **Rover** page
- Satellites below the **<Cut Off Angle:>** configured in **CONFIGURE Satellite Settings** are shown in grey.



CONT (F1)
To exit **STATUS Satellites**.

GPS X / GPS ✓ (F2)
To hide or show the GPS satellites (shown by the prefix G). Available for GX1230 GG/ATX1230 GG when **<Sat System: GPS & Glonass>** is configured in **CONFIGURE Satellite Settings**.

GLO X / GLO ✓ (F3)
To hide or show the GLONASS satellites (shown by the prefix R). Available for GX1230 GG/ ATX1230 GG when **<Sat System: GPS & Glonass>** is configured in **CONFIGURE Satellite Settings**.

HELTH (F4)
To view the numbers of satellites categorised in good, bad and unavailable.

Description of columns

Column	Description
Sat	The Pseudo Random Noise number (GPS) or the slot number (GLONASS) of the satellites.
Elev	The elevation angle in degrees. The arrow indicates if a satellite is rising or falling.

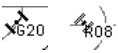
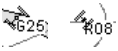
Column	Description
Azmth	The azimuth of the satellite.
S/N 1 and **S/N 2**	The signal to noise ratio on L1 and L2. The number is shown in brackets if the signal is currently not being used in the position calculations.

Next step
PAGE (F6) changes to the **Skyplot** page.

STATUS Satellites, Skyplot page

The skyplot shows satellite information in a graphical way. Satellites below the **<Cut Off Angle:>** configured in **CONFIGURE Satellite Settings** are marked grey. The part of the skyplot between the 0° elevation and the cut-off angle is marked grey.

Description of symbols

Symbol	Description
	Satellites above the **<Cut Off Angle:>** configured in **CONFIGURE Satellite Settings**.
	Satellites below the **<Cut Off Angle:>** configured in **CONFIGURE Satellite Settings**.

Next step
CONT (F1) exits **STATUS Satellites**.

25.7.2 Real-Time Status

Description

This screen shows information related to real-time data. The name of the screen changes depending on the configuration:

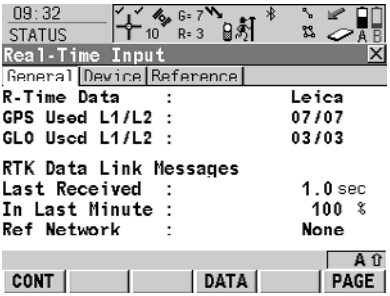
Real-time rover configuration:	**STATUS Real-Time Input**
Real-time reference configuration with one real-time device:	**STATUS Real-Time Output**
Real-time reference configuration with two real-time devices:	**STATUS Real-Time Output 1** and **STATUS Real-Time Output 2**

For simplicity, the screen is named here as **STATUS Real-Time**. Differences depending on the configurations are outlined.

Access

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **SmartStation...**
4.	Select **Real-Time Status**.

STATUS Real-Time, General page



CONT (F1)
To exit **STATUS Real-Time**.

DATA (F4)
To view the data being received. Depending on **<R-Time Data:>**, the shown data differ.

REF2 (F5) and **REF1 (F5)**
Available for **<R-Time Mode: Reference>** with two real-time devices configured. To change between the status information for both real-time devices.

Description of fields

Field	Description
<R-Time Data:>	The received real-time data format message type.
<GPS used L1/L2:>	The number of satellites on L1 and L2 being used in the current position solution.
<GLO used L1/L2:>	Available for SmartStation/ATX1230 GG when **<Sat System: GPS & GLONASS>** is configured in **CONFIGURE Satellite settings**. The number of satellites on L1 and L2 being used in the current position solution.
<Sats used L1/L2:>	The number of satellites on L1 and L2 being used in the current position solution.

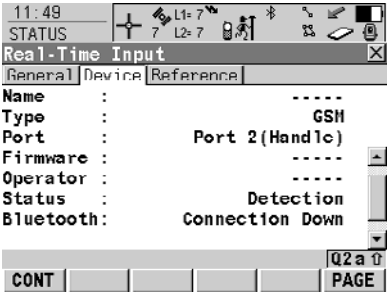
Field	Description
<Last Received:>	Available for **<R-Time Mode: Rover>**. Seconds since the last message from the reference was received.
<In Last Minute:>	Available for **<R-Time Mode: Rover>**. The percentage of real-time data received from the reference compared with the data received from the GPS antenna within the last minute. This indicates how well the datalink is working.
<Ref Network:>	Available for **<R-Time Mode: Rover>**. The type of reference network in use.
<Output NMEA:>	Available for **<R-Time Mode: Rover>** unless **<Ref Network: None>**. The type of NMEA message send to the reference network. If more than one message is send at a time, then all types are shown separated by comma.

Next step

PAGE (F6) changes to the **Device** page.

STATUS Real-Time, Device page

The content of this page differs for each type of device in use.



CONT (F1)
To exit **STATUS Real-Time**.

ACCNT (F3)
Available for Smartgate device. To view Smartgate account information.

VERS (F4)
Available for Smartgate device. To view Smartgate version information.

For all devices available

Description of fields

Field	Description
<Name:>	The name of the device.

For digital cellular phones and modems

Description of fields

Field	Description
<Type:>	The type of device.
<Port:>	The port to which the device is connected.
<Firmware:>	The software version of the attached digital cellular phone.

Field	Description
<Operator:>	The name of the network operator in which the digital cellular phone is operating.
<Status:>	The actual mode of the digital cellular phone. The options are **Unknown**, **Searching** and **Registered**.
<Bluetooth:>	Available if device is connected via bluetooth. Indicates the state of the connection.
<Signal:>	Indication of received signal strength of the digital cellular phone network.

For radios

Description of fields

The available fields depends on the radio type.

Field	Description
<Port:>	The port to which the device is connected.
<Type:>	The type of device.
<Channel:>	The radio channel.
<Actual Freq:>	The actual set frequency of the radio.
<Central Freq:>	The defined central frequency of the radio.
<Firmware:>	The software version of the attached radio.

Next step

PAGE (F6) changes to the **Reference** page.

STATUS Real-Time, Reference page; STATUS Real-Time, Ref (VRS) page

The name of the page changes depending on the type of reference being used.

Description of fields

Field	Description
<Ref Stn ID:>	An identification for a reference station. The ID can be converted into a compact format to be send out with real-time data in all real-time data formats. It is different from the point ID of the reference station.

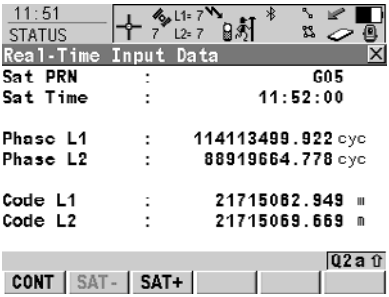
Field	Description
<Antenna Ht:>	• For **<R-Time Data: Leica>**, **<R-Time Data: RTCM v3.0>** or **<R-Time Data: RTCM X v2>** with **<RTCM Version: 2.3>**: The antenna height at the reference from the marker to the MRP. • For **<R-Time Data: CMR/CMR+>** and **<R-Time Data: RTCM 18, 19 v2>** or **<R-Time Data: RTCM 18, 19 v2>** with **<RTCM Version: 2.2>** The antenna height at the reference from the marker to the phase center. • For all other **<R-Time Data:>**: **-----** is displayed because the data format does not include information about the antenna height.
<Coords of:>	The coordinates for the reference station which are transferred depend on the active real-time data format. • For real-time messages which include antenna height and antenna type: **Marker**. • For real-time messages which do not include antenna Information: **Phase Centre** of L1.

Next step
CONT (F1) exits **STATUS Real-Time**.

STATUS Real-Time Input Data

The following provides additional information on the satellite data received via real-time message. Information of those satellites is displayed, which are used on both reference and rover.

Access
DATA (F4) on **STATUS Real-Time, General** page.



CONT (F1)
To return to **STATUS Real-Time**.
SAT- (F2)
To display information about the satellite with the next smaller PRN.
SAT+ (F3)
To display information about the satellite with the next larger PRN.

Description of fields
The data being received from the satellites and the layout of the screen depend on the active real-time data format.

Field	Description
<Sat PRN:>	The PRN number (GPS) or the slot number (GLONASS) of the satellites shown with the prefix G (GPS) or R (GLONASS).
<Sat Time:>	The GPS time of the satellite.
<Phase L1:>, <Phase L2:>	The number of phase cycles from the antenna to the satellite on L1 and L2.
<Msg 18 L1:>, <Msg 18 L2:>	The uncorrected carrier phases for L1 and L2.
<Msg 20 L1:>, <Msg 20 L2:>	The carrier phase corrections for L1 and L2.
<Code L1:>, <Code L2:>	The pseudorange between the antenna to the satellite for L1 and L2.
<Msg 19 L1:>, <Msg 19 L2:>	The uncorrected pseudoranges for L1 and L2.
<Msg 21 L1:>, <Msg 21 L2:>	The pseudorange corrections for L1 and L2.
<PRC:>	Pseudorange corrections.
<RRC:>	Rate of change of the corrections.
<IODE:>	**I**ssue **O**f **D**ata **E**phemeris. The identification number of the ephemeris for a satellite.

Next step

CONT (F1) returns to the screen from where **STATUS Real-Time Input Data** was accessed.

25.7.3 Current Position

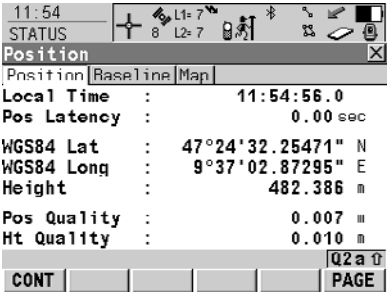
Description

This screen shows information related to the current antenna position and the speed of the antenna. For real-time rover configurations the baseline vector is also shown. MapView shows the current position in a graphical way.

Access

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **SmartStation...**
4.	Select **Current Position**.

STATUS Position, Position page



CONT (F1)
To exit **STATUS Position**.

COORD (F2)
To see other coordinate types. Local coordinates are available when a local coordinate system is active.

SHIFT ELL H (F2) and **SHIFT ORTH (F2)**
Available for local coordinates. To change between the ellipsoidal and the orthometric height.

Description of fields

Field	Description
<Pos Latency:>	The latency of the computed position. Latency is mainly due to time required for data transfer and computation of position. Depends on the use of the prediction mode.
Pos Quality and **Ht Quality**	Available for phase fixed and code only solutions. The 2D coordinate and height quality of the computed position.
HDOP and **VDOP**	Available for navigated solutions.

Next step
PAGE (F6) changes to the **Baseline** or **Speed** page.

STATUS Position, Baseline page

Information on the baseline vector is displayed.

Next step
PAGE (F6) changes to the **Speed** page.

STATUS Position, Speed page

Description of fields

Field	Description
<Horizontal:>	The speed over ground in the horizontal direction.
<On Bearing:>	Available for local coordinate systems. The bearing for the horizontal direction related to the North direction of the active coordinate system.
<Vertical:>	The vertical component of the actual velocity.

Next step

PAGE (F6) changes to the **Map** page.

STATUS Position, Map page

The **Map** page provides an interactive display of the data.

Next step

CONT (F1) exits **STATUS Position**.

25.7.4 Logging Status

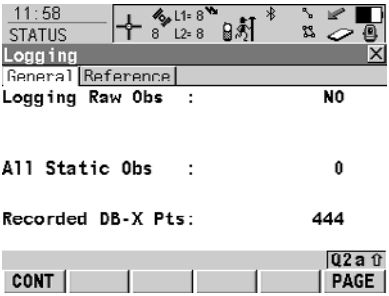
Description

This screen shows information related to logging of raw observations.

Access

Step	Description
1.	Press **USER** to **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **SmartStation...**
4.	Select **Logging Status**

STATUS Logging, General page



CONT (F1)
To exit **STATUS Logging**.

Description of fields

Field	Description
<Logging Raw Obs:>	**YES** or **NO**.
<All Static Obs:>	The number of static epochs recorded in the current job.
<Recorded DB-X Pts:>	The number of manually occupied points and auto points stored in the job.

Next step
PAGE (F6) changes to the **Reference** page.

STATUS Logging, Reference page

Description of fields

Field	Option	Description
<Log Static Obs:>	A time in sec	The logging rate at the reference. This information is shown if the real-time message format supports this information and raw observations are being logged at the reference.
	Not known	The real-time message format does not support this information or the information is not yet received by the rover.

Field	Option	Description
	None	Raw observations are not being logged at the reference.

Next step
CONT (F1) exits **STATUS Logging**.

25.7.5 SmartAntenna System Info

Access

Step	Description
1.	Press **USER** to access **TPS1200+ User Menu**.
2.	Press **STAT (F3)** to access **STATUS Status Menu**.
3.	Select **SmartStation...**
4.	Select **SmartAntenna System Info**.

STATUS SmartAntenna Information

Shows the versions of all system firmware.

Description of fields

Field	Description
<Type:>	The type of antenna.
<Meas Engine:>	The firmware version for the measurement engine.
<Meas Eng Boot:>	The firmware version of the boot software for the measurement engine.

Next step

CONT (F1) exits **STATUS SmartAntenna Information**.

26 NTRIP via Internet

26.1 Overview

Description

Networked **T**ransport of **R**TCM via **I**nternet **P**rotocol

- is a protocol streaming real-time corrections over the Internet.
- is a generic protocol based on the Hypertext Transfer Protocol HTTP/1.1.
- is used to send differential correction data or other kinds of streaming data to stationary or mobile users over the Internet, allowing simultaneous PC, laptop, PDA, or receiver connections to a broadcasting host.
- supports wireless Internet access through mobile IP networks like digital cellular phones or modems.

System components

NTRIP consists of three system components:

- NTRIPClients
- NTRIPServers
- NTRIPCaster

Refer to the TPS1200+ Technical Reference Manual for more information about NTRIP.

26.2 Configuring SmartStation for Using NTRIP Service

26.2.1 Configuring an Access to the Internet

Requirements

- SmartStation must be used.
- Firmware v2 or higher must be loaded on the TPS1200+ instrument.
- Firmware v1.42 or higher must be loaded on the RX1200.

☞ To access to the Internet with SmartStation, **G**eneral **P**acked **R**adio **S**ystem devices will normally be used. GPRS is a telecommunication standard for transmitting data packages using the Internet Protocol (IP).

Configure access to Internet step-by-step

The following table explains the most common settings. Refer to the stated chapter for more information on screens.

Step	Description
1.	Select **Main Menu: Config...\Interfaces...**.
2.	In **CONFIGURE Interfaces** highlight **Internet**.
3.	**EDIT (F3)** to access **CONFIGURE Internet Interface**.
4.	**CONFIGURE Internet Interface** **<Internet: Yes:>** **<IP Address: Dynamic>** **<User ID:>** Some providers ask for a user ID to allow connecting to the Internet via GPRS. Contact your provider if a user ID needs to be used. **<Password:>** Some providers ask for a password to allow connecting to the Internet via GPRS. Contact your provider if a password needs to be used.
5.	**DEVCE (F5)** to access **CONFIGURE GSM/Modem Devices**.
6.	**CONFIGURE GSM/Modem Devices** Highlight the GPRS device to be used.
☞	**NEW (F2)** to create a new device.
7.	**CONT (F1)** to return to **CONFIGURE Internet Interface**.
8.	**CONT (F1)** to return to **CONFIGURE Interfaces**.
9.	**CTRL (F4)** to access **CONFIGURE XX Connection**.
10.	**CONFIGURE XX Connection** Type in relevant information.
☞	**CODES (F3)** Available for digital cellular phones of GSM technology. To enter the **P**ersonal **I**dentification **N**umber of the SIM card. If the PIN is locked for any reason, for example the wrong PIN was entered, input the **P**ersonal **U**nbloc**K**ing code for access to the PIN.
11.	**CONT (F1)** to return to **TPS1200+ Main Menu**.
☞	The instrument is now online to the Internet. The Internet online status icon is displayed. But because GPRS is being used, no charges are yet made since no data transfer from the Internet has yet taken place.

Step	Description
12.	**USER**
13.	**STAT (F3)** to access **STATUS Status Menu**.
14.	Highlight **Interfaces...**.
15.	**ENTER** to access **STATUS Interfaces**.
16.	**STATUS Interfaces** Highlight **Internet**.
17.	**IFACE (F3)** to access **STATUS Internet**.
18.	**STATUS Internet** This screen shows • if SmartStation is online on the Internet. • for how long SmartStation is online. • the technology of data transfer. • the amount of data received or sent since SmartStation is online.
19.	**CONT (F1)** to return to **STATUS Interfaces**.
20.	**CONT (F1)** to return to **TPS1200+ Main Menu**.

26.2.2 Configuring to Connect to a Server

Requirements

The configurations from the previous chapter must have been completed. Refer to "26.2.1 Configuring an Access to the Internet".

Configure connect to a server step-by-step

Step	Description
1.	Select **Main Menu: Config...\Interfaces...**.
2.	In **CONFIGURE Interfaces** highlight **GPS RTK**.
3.	**EDIT (F3)** to access **CONFIGURE Real-Time Mode**.
4.	**CONFIGURE Real-Time Mode** **<R-Time Mode: Rover>** **<R-Time Data:>** Select the type of data to be received from the Internet. **<Port: NETx>**
5.	**CONT (F1)** to return to **CONFIGURE Interfaces**.
6.	Highlight **GPS RTK**.
7.	**CTRL (F4)** to access **CONFIGURE Set NET Port**.
8.	**CONFIGURE Set NET Port** **<User: Client>** **<Server:>** The server to be accessed in the Internet. Opening the choicelist accesses CONFIGURE Server to Connect where new servers can be created or existing servers can be selected or edited. **<IP Address:>** The IP address of the server to be accessed in the Internet. **<TCP/IP Port:>** The port of the Internet server through which the data is provided. Each server has several ports for various services. **<Auto CONEC: Yes>** Allows for automatic connection between the SmartStation and the Internet when a point is occupied during a survey. Ending the point occupation also ends the Internet connection.
9.	**CONT (F1)** to return to **CONFIGURE Interfaces**.
☞	Once SmartStation is connected to the server a message is displayed in the message line.
10.	**CONT (F1)** to return to **TPS1200+Main Menu**.
11.	**USER**
12.	**STAT (F3)** to access **STATUS Status Menu**.
13.	Highlight **Interfaces...**.
14.	**ENTER** to access **STATUS Interfaces**.
15.	**STATUS Interfaces** Highlight **GPS RTK**.
16.	**DEVCE (F5)** to access **STATUS Device: Ethernet**.
17.	**STATUS Device: Ethernet**

Step	Description
	Check the Internet online status.
18.	**CONT (F1)** to return to **STATUS Interfaces**.
19.	**CONT (F1)** to return to **TPS1200+ Main Menu**.

26.2.3 Using the NTRIP Service with SmartStation

Requirements

The configurations from the previous chapter must have been completed. Refer to "26.2.2 Configuring to Connect to a Server".

Use NTRIP service step-by-step

Step	Description
1.	Select **Main Menu: Config...\Interfaces...**.
2.	In **CONFIGURE Interfaces** highlight **GPS RTK**.
3.	**EDIT (F3)** to access **CONFIGURE Real-Time Mode**.
4.	**CONFIGURE Real-Time Mode** **<Port: NETx>** must be selected.
5.	**ROVER (F2)** to access **CONFIGURE Additional Rover Options**.
6.	**PAGE (F6)** to access **CONFIGURE Additional Rover Options**, **NTRIP** page.
7.	**CONFIGURE Additional Rover Options**, **NTRIP** page
8.	**<Use NTRIP: Yes>** **<User ID:>** A user ID is required to receive data from to the NTRIPCaster. Contact the NTRIP administrator for information. **<Password:>** A password is required to receive data from the NTRIP-Caster. Contact the NTRIP administrator for information.
9.	**SRCE (F5)** to access **CONFIGURE NTRIP Source-Table**.
10.	**CONFIGURE NTRIP Source-Table** All MountPoints are listed. MountPoints are the NTRIP servers sending out real-time data. This screen consists of two columns: First column **MountPoint**: The abbreviations for the MountPoints. Second column **Identifier**: The city where the MountPoint is located. Highlight a MountPoint about which more information is required. This information helps to configure SmartStation to use the selected Mount-Point as a reference.
11.	**INFO (F3)** to access **CONFIGURE MountPoint: XX**.
12.	**CONFIGURE MountPoint: XX**, **General** page **<Format:>** The real-time data format sent out by the MountPoint. **<FormatDet:>** Details about **<Format:>**, for example the RTCM message types including update rates in seconds displayed in brackets. **<Authentic:>** The type of password protection required for the authorisation to the NTRIPServer. **<Authentic: None>** if no password is required. **<Authentic: Basic>** if the password need not be encrypted. **<Authentic: Digest>** if the password must be encrypted. **<NMEA:>** Indicates if the MountPoint must receive GGA NMEA data from the rover in order to compute VRS information.

Step	Description
	<Charges:> Indicates if charges are currently made for the connection. **<Carrier:>** The type of carrier message sent out. **<System:>** The type of satellite system supported by the MountPoint.
13.	**PAGE (F6)** to access **CONFIGURE MountPoint: XX**, **Location** page.
14.	**CONFIGURE MountPoint: XX**, **Location** page Detailed information about the location of the MountPoint is displayed.
15.	**PAGE (F6)** to access **CONFIGURE MountPoint: XX**, **Miscell** page.
16.	**CONFIGURE MountPoint: XX**, **Miscell** page **<Generator:>** The hard- or software generating the data stream. **<Compress:>** The name of the compression / encryption algorithm. **<Info:>** Miscellaneous information if available.
☞	**PREV (F2)** to display information about the previous MountPoint in the list.
☞	**NEXT (F3)** to display information about the next MountPoint in the list.
17.	**CONT (F1)** to return to **CONFIGURE NTRIP Source-Table**.
18.	**CONT (F1)** to return to **CONFIGURE Additional Rover Options**.
☞	**SHIFT CONEC (F3)** and **SHIFT DISCO (F3)** are now available in GPS mode to connect to and disconnect from the NTRIPServer.

27 Menu Tree

Menu tree

- MAIN MENU
  - SURVEY
  - PROGRAMS...
  - MANAGE...
    - JOBS
    - DATA
    - CODELISTS
    - COORDINATE SYSTEMS
    - CONFIGURATION SETS
    - REFLECTORS
  - CONVERT...
    - EXPORT DATA FROM JOB
      - EXPORT ASCII
      - EXPORT LandXML
      - EXPORT DXF
    - IMPORT DATA TO JOB
      - IMPORT ASCII/GSI
      - IMPORT DXF
    - COPY POINTS BETWEEN JOBS
  - CONFIG...
    - SURVEY SETTINGS...
      - ID TEMPLATES
      - DISPLAY SETTINGS
      - CODING & LINEWORK SETTINGS
      - OFFSETS
      - TARGET CHECK
    - INSTRUMENT SETTINGS...
      - EDM & ATR SETTINGS
      - SEARCH WINDOWS
      - AUTOMATIC PRISM SEARCH
      - TPS CORRECTIONS
      - COMPENSATOR
      - INSTRUMENT ID
    - GENERAL SETTINGS...
      - WIZARD MODE
      - HOT KEYS & USER MENU
      - UNITS & FORMATS
      - LANGUAGE
      - LIGHTS, DISPLAY, BEEPS, TEXT
      - START UP & POWER DOWN
      - TELESCOPE ACCESSORIES

- INTERFACES...
  - GSI OUTPUT
  - GEOCOM MODE
  - RCS MODE
  - EXPORT JOB
  - GPS RTK, for SmartStation
  - INTERNET, for SmartStation
- SMARTSTATION..., for SmartStation
  - REAL-TIME MODE, for SmartStation
  - POINT OCCUPATION SETTINGS, for SmartStation
  - SATELLITE SETTINGS, for SmartStation
  - LOCAL TIME ZONE, for SmartStation
  - QUALITY CONTROL SETTINGS, for SmartStation
  - LOGGING OF RAW OBS, for SmartStation

TOOLS...

- FORMAT MEMORY DEVICE
- TRANSFER OBJECTS...
  - CODELISTS
  - CONFIGURATION SETS
  - COORDINATE SYSTEMS
  - GEOID FIELD FILES
  - CSCS FIELD FILES
  - FORMAT FILES
  - JOBS, if internal memory is fitted
  - SYSTEM RAM CONTENTS
  - MODEM/GSM STATIONS, for SmartStation
  - IP HOSTS, for SmartStation
  - ANTENNA RECORDS, for SmartStation
- UPLOAD SYSTEM FILES...
  - APPLICATION PROGRAMS
  - SYSTEM LANGUAGES
  - INSTRUMENT FIRMWARE
- CALCULATOR
- FILE VIEWER
- LICENCE KEYS
- CHECK & ADJUST...
  - COMBINED (l, t, i, c, ATR)
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Leica Geosystems AG
Heinrich-Wild-Strasse
CH-9435 Heerbrugg
Switzerland
Phone +41 71 727 31 31
www.leica-geosystems.com

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